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IMPROVED TRUCK AND FIRE-ESCAPE.

The ladder truck which we here illustrate seems to us—judging merely from its mechanical arrangements—to combine facility of locomotion and erection, stability of support and efficiency of service more perfectly than any other that we ever examined.

It consists principally of two ladders, A and B, hinged together near the middle, with the lower end of each attached to a truck, the trucks being independent of each other. For transportation about the streets the trucks are drawn apart and the ladders are lowered, as represented in Fig. 2. The ladders are raised by simply drawing the trucks together, when they are secured in contact by a stout hook. A rope, *c*, is fastened to one ladder near its upper end, rove through a block in the other ladder and leads to the ground; and when the ladders are raised this rope is drawn taught, operating as a powerful stay in their support. Near the top of ladder B is hinged a third ladder, D, which, as the ladders rise, rests across the top of ladder A, and which is raised by means of a rope attached to it near the middle, and running over the top of ladder B; its falling over being controlled by the rope, *e*, fastened to its upper end. After the ladders are raised they are connected and braced by the short ladders, as shown in Fig. 1.

A hose is permanently attached to ladders, B and D, extending their whole length; the manner of folding the ladders permitting this arrangement. This will be appreciated by firemen as one of the most valuable features in this invention, as it saves all the time and hard lifting usually expended in carrying up long hose. For rescuing persons from burning buildings, a sheet iron bucket is used in the manner shown in Fig. 1.

Each truck is constructed of two iron plates or rings, upon one of which the gallows frame supporting the ladder is constructed, while the other carries the axles of the wheels; the two plates being secured one upon the other by a flange projecting downward from the upper rim. This enables the wheels to be turned so that the trucks can be run in any direction after the ladders are raised, by which means the ladders may be turned about and pushed near a building or removed from it, as occasion may require.

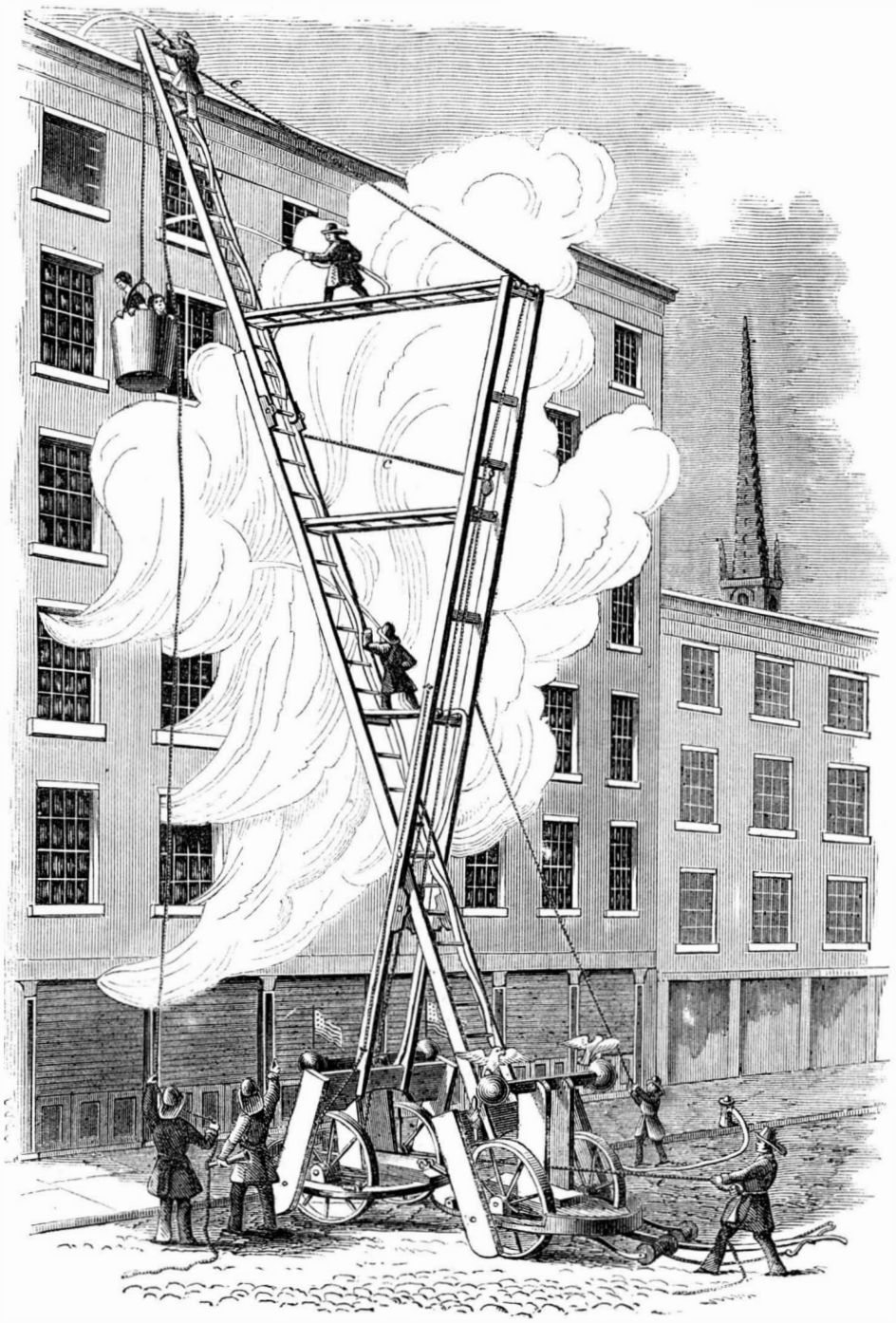
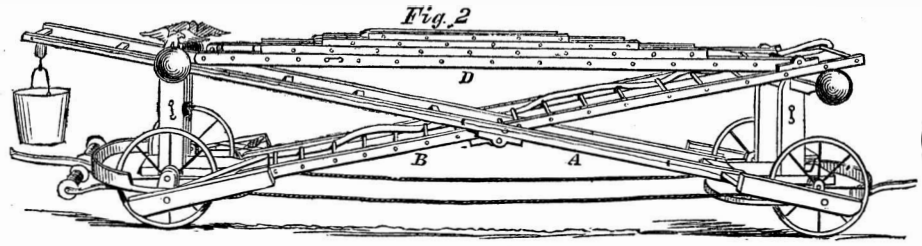


Fig. 2



BURTON'S IMPROVED FIRE-ESCAPE.

In raising this ladder the trucks are drawn together by blocking the wheels of one and pulling the other up to it by means of the side ropes; an operation requiring but a fraction of one minute to accomplish. The long hose being secured to the ladder is carried up with it, and this hose being provided at its lower end with a screw for connecting it with the engine or hydrant hose, the water may be flowing upon the fire in a very short space of time. After the ladder is erected, it stands very firmly upon its supports, affording room for the operations of a large number of men. It seems to us to be superior in several of the most important essentials to any other firemen's ladder and truck that has yet been invented.

Letters Patent for this invention were granted to O. F. Burton and M. H. Hovey, through the Scientific American Patent Agency, on August 7, 1860. A working model is now on exhibition at Herring & Co.'s Safe Warerooms, No. 251 Broadway. For further information address the patentees at the above number.

A NEW CANNON.—The London *Times* gives a detailed account of an improved breech-loading cannon, which is capable of discharging, with ease, 20 rounds per minute. This improvement is effected by a lever, placed on the side of the breech, which by one simple movement raises the cock of the gun, and opens the breech; the reverse movement entirely closing the breech, cutting the cartridge used, priming the nipple, and firing the gun instantaneously—the effect of which is, that the cannon may be discharged as rapidly as the charges can be inserted in the breech, as two simple movements are all that is necessary to prepare the gun for being fired, and actually discharging it. An improvement has also been made in the balls used for this description of fire-arm. A chemical composition is applied to the balls, which answers the purpose so effectively that not the slightest fouling of the gun can be detected. This breech-loading cannon appears to be identical with Sharpe's American rifle, the breech of which is opened and closed by a lever.

THE Philadelphia *Ledger* states that Mr. A. Pardee has just completed the deepest slope in the United States, at Sugar Loaf Colliery, near Hazleton, Pa., having reached the fourth lift, 900 feet below the surface. The slope is 619 yards long, viz.: 84 yards to the first lift, 184 to the second, 284 to the third, and 619 to the fourth, from which the mining of the coal has now commenced. The vein varies in thickness from four to six and seven feet.

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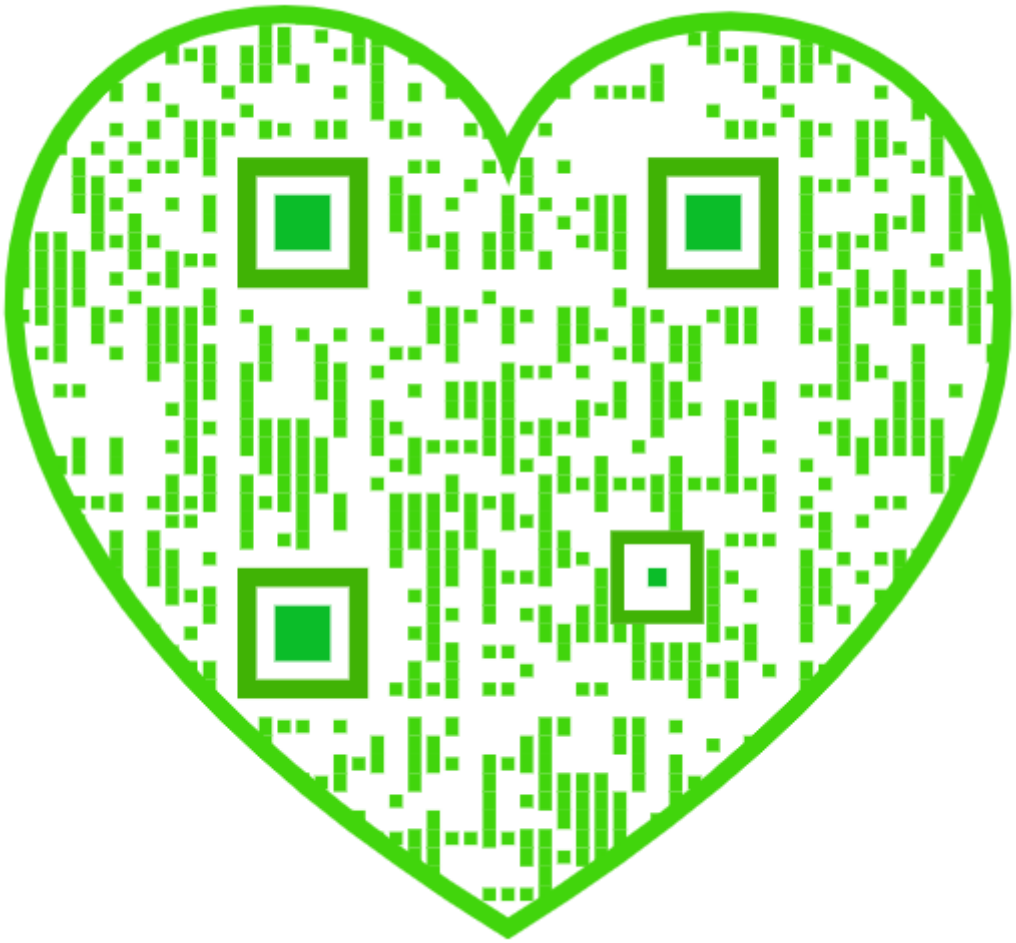
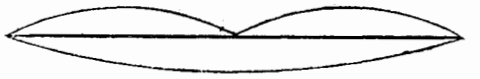


THE MECHANICS AND MATHEMATICS OF MUSICAL VIBRATIONS.

BY SPENCER B. DRIGGS.

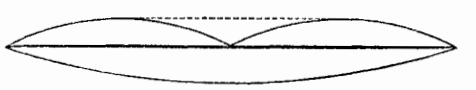
When a string of proper length and thickness is strained to a tension that will cause it to produce 440 double vibrations—that is, to pass the center or resting position 880 times and to make 440 vibrations to the extreme on either side of the center per second—it gives a sound corresponding to pitch *A*. Simultaneously with the commencement of vibration, the string divides itself into aliquot parts, forming nodal points where the vibrations seem to cross. These aliquot parts, by their additional vibrations, produce the octave, the twelfth, fifteenth and nineteenth to the fundamental or pitch sound *A*, and are the *natural* harmonies accompanying every musical sound. And although the normal or pitch sound is obtained *only* by the vibration *of the entire length* of the string between the two bearing points (which would render the secondary or intermediate ones unnecessary so far as relates to the pitch of sound), it is, however, impossible to avoid these harmonies while the string must act against the air with such rapidity and force; and it is quite right that they cannot be avoided as will be hereafter seen. The point of contact being pressed or driven farther out of line than any other portion of the string, will return also further in an opposite direction when free from pressure; and as the air cannot act with equal resistance on all parts, that is, the middle or point of contact cannot move through a greater space in the same length of time that other portions do through a less space, without producing a higher or more acute sound, there appears an absolute necessity for these counter-vibrations, which soften down the otherwise harsh and intolerably unpleasant sounds that must occur in their absence. These nodal points are, however, *only* such to the *intermediate* vibrations, and must of necessity change their position (not relatively) or places with each vibration of the whole string.

I cannot too fully impress the fact that the *whole* string continues to vibrate as long as the *pitch sound* is given, and no longer, and that these vibrations *alone* give the proper pitch sound, which is readily seen by placing an edge upon the string at any of its harmonic nodes, when the principal vibrations at once cease, and the harmonies become the prominent sounds. For example, place the edge at the middle, and the octave sound continues clear and loud. Then place the edge at one-fourth the length, and the second octave or fifteenth becomes prominent and clear, and at the same time the fourth is plainly given by the other three parts. And although these divisions continue to vibrate, nothing can be heard from the whole or *principal* vibrations from the instant the string is touched, which clearly shows that they had ceased when the harmonies became prominent. But notwithstanding the harmonizing influences of these small divisions, any string may be forced to produce exceedingly harsh and unpleasant sounds, by applying a force to put it in vibration beyond its power to instantly recover, or by bringing in contact with it a substance so hard and inelastic that, at the point of concussion, it is forced too suddenly beyond the power of the other portions to sympathize with it, when the result will be harsh and totally unmusical sounds. A very correct idea of this may be obtained by witnessing the various sounds that a fine violinist can produce upon any one string of his instrument, without any change whatever except in the manner of applying and drawing the bow. He can draw the bow so evenly and delicately that only a small portion of the string can be heard to vibrate, producing thereby the most pleasing high sound or one of the harmonies natural to the whole string (and if he wishes to change the harmonic he has to change the length of the string by placing his finger upon it) and, by increasing the power, can cause the whole string to vibrate and produce its regular pitch sound, and so on increasing the power until the friction of the bow will not allow the string to recover its original position at each vibration, when it becomes overpowered and the sound evolved is extremely harsh and "scraping." So also a piano-forte hammer of wood, and without covering, coming in contact with the string will produce some of the most unpleasant and discordant sounds imaginable and so destroy the pitch sound that it can only, with great difficulty and by the most [illegible] vibrations commence simultaneously with the principal) whose one node is at the middle of the string and the others at the ends or original bearing points, thus—



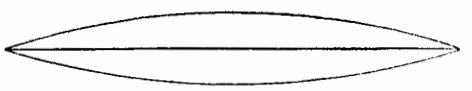
These two halves each vibrate twice, by their own additional vibrations, to the whole string once, and each produces the octave to the fundamental note. This division of the vibrations, as well as the others mentioned below, the string is compelled to make in order to preserve its own cohesion and identity. And when these first subordinate vibrations, as shown in the above figure, mingle with the principal, that is to say, when they so unite in motion as to move in the same direction as the principal, as a matter of course during the time that the halves are passing over the whole, either way, their motion is accelerated one-third by being added to the principal, when each octave division produces the musical twelfth, which proves that the velocity with which a string passes through the air regulates the *pitch* of the sound it produces, and not necessarily the *number* of vibrations it produces in a given length of time. But it is also true that a string one-third shorter than either of the above octave divisions (one-sixth the length of the whole string) would of its own principal vibrations produce the said twelfth, and the only way it could pass through the air with sufficient velocity to produce that high sound would be to make one-third or fifty per cent more vibrations in number in the same length of time. Assuming that the whole string first above mentioned is strained to its full vibrating tension, which any string should be to produce the fullest sound of which it is capable, it will be readily seen that so long a string as the one-half of the whole would be, could not recover itself and maintain its identity when compelled to vibrate with sufficient rapidity to produce so high a sound, as the force necessary to start it with that velocity would instantly overpower and break it. And again, when these half parts move in the *opposite* direction to that of the whole string, each half part gives the fundamental note exactly the same as the principal. Then if they are subordinate (these half parts), which they really are, and wholly depend upon the principal for their vibrations, as a matter of course they must go *with* the whole string, and their motion through the air must be accelerated and retarded alternately with each vibration of the principal. And although the *number* of vibrations per second are the same and unchanged in any of their relations, it can be readily seen that the same amount that is added to, to produce the twelfth, when moving *with*, must be taken from when moving *opposite to* the principal, which will result as above stated. The same principle is equally applicable to each division that the string makes for the subordinate vibrations. Whatever is added when they coincide must be deducted when they are opposed in motion in regular alternation. By way of illustration I will suppose a man to run at the rate of 10 miles an hour on the top of a railroad car that is running at the rate of 20 miles per hour. When moving in the same direction as the train he passes through the air at the rate of 30 miles the hour, and when running in the opposite direction his real headway is reduced to 10 miles per hour.

The next division of the vibrations is into fourth parts, the two middle sections forming additional vibrations and producing again the octave to the fundamental note, the same as the first-mentioned division, thus—

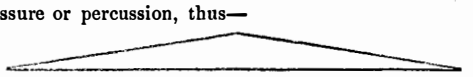


When its motion unites with that of the principal it produces the twelfth; and when its movement is united with that of the two first-mentioned octave divisions, and having its nodes upon their centers, as shown by the dotted line at the top of the above figure of illustration, it produces the fifteenth. In this figure we also see a still greater disproportion of length of string to the pitch of sound. Still further, we find that this division (being one-half the length of the whole string) gives, at different times during vibration, four distinct sounds, as follows, viz: 1st, the fundamental, when moving opposite to the principal; 2d, of its own separate vibrations it gives the octave; 3d, when added to the principal it gives the twelfth; and 4th, when added to the first

I will now consider and more particularly explain the vibration of a string, as per result of my mathematical calculations and experiments, and believe the following to be not only an original but a perfect solution of one of the most difficult problems that have received the attention of philosophers and mathematicians for ages, and can reasonably say that the simplicity of its truth is the only thing that renders it wonderful that it was not discovered by every one who has heretofore studied or written upon the subject, and more particularly so as it involves the laws that control *all* vibration. When a string of a given length is put in vibration and its tension, thickness, temper and the force applied to start it are all in proportion to the length and cohesive power of its material, it will be found to give, as the most prominent, its proper pitch sound, which is evolved by the vibrations of its *entire* length between the two resting points, thus—



I shall denominate this the principal vibration or fundamental sound; but, as above stated, the resistance of the air will not allow the middle portion to move through a space so disproportioned to that through which the parts nearer the bearings do, in the same length of time, and more particularly to continue in the angular movement or shape in which the point of concussion must necessarily compel it to commence, whether by pressure or percussion, thus—



Instantly when freed, an additional vibration is commenced (or when put in vibration by means of a blow or other sudden concussion, these additional or subordin-

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octave division it gives the second octave or fiftcenth, as above stated.

When the proportions of thickness, tension, length, &c., as before stated, are balanced, I believe the above *four* divisions to be *all* that any string makes while vibrating, notwithstanding the various contortions and impossible shapes it has been made to assume in the imagination and figurings of some writers on the subject, the proof of which I shall endeavor to give below. There are, however, some additional vibrations from the above five nodal points. For instance, each fourth part has a vibration of its own, which sounds the fifteenth, and when its motion is *with* that of the principal it produces the seventeenth, which frequently becomes the most prominent of the harmonic vanishings, and when the string is too thick or overstrained, the seventeenth not unfrequently becomes unpleasantly prominent with the principal; and so on, still higher, when united with the movement of the first-mentioned octave divisions, but as these are not distinguishable by the the ear, they are less important. There may be also still one other section of separate vibration, viz: taking three of the above four equal divisions; but this is never a prominent sound, except when the finger or other substance is placed upon the string at one-fourth its length, to stop the principal, when this division becomes quite prominent and sounds the fourth. When the string is in full vibration, this section must give the octave; as also the twelfth whenever its own movement is combined respectively with, and added to, one of greater or less velocity than itself, on the same principle as above mentioned.

That a string may be so long and its tension so little or so great in proportion to its length, or when these proportions are right, the manner and power of vibrating it may cause it to form a more compound motion for the instant, I have no doubt, as I have already shown in playing the violin and piano-forte. But as these calculations and experiments have been made for the purpose of analyzing purely musical vibrations, I shall not attempt to go farther with this investigation than its uses extend. I have no doubt, however, that the foregoing will be found to be perfectly true in all the particulars that relate to the laws of vibration; and the few exceptions of certain disproportions which have been mentioned would aid in establishing that as fact. For example: When a string is too *thin* for its length, the lower harmonies—the fourth and the fifth—will become altogether too prominent to admit of proper or pleasing harmony when used in connection with other notes to form a full chord; and, on the other hand, when the string is too *thick* for its length, the higher harmonies stand out with equally unpleasant prominence; by the presence of either of which an acute ear will readily detect the want of proper proportion. Before proceeding with the proofs I will merely state that I have made probably about one hundred different experiments to arrive at a satisfactory result. Many of the experiments were made upon different stringed instruments of music before I found that the sympathetic connection with other strings quite effectually destroyed the possibility of arriving at any definite conclusion. Oftentimes the harmonies from other strings became more prominent than those on the string under experiment. So any one who may wish to prove for himself the truth of what I have written will do well to have but a single string at a time, arranged on a sounding-board by itself, and as free from any and all sympathetic sounds as possible. I found this to be absolutely necessary.

The proofs of the foregoing assertions are as follows:—

First: That the string divides itself into the four parts, as above stated, will be seen by placing the finger at any of the nodal points mentioned, while vibrating, when the pitch of the harmonic sounds described (less the vibrations of the principal, which, of course, cease when the string is touched) will be clearly distinguishable in the absence of all other sounds.

Second: By moving the point of contact away from these nodal points—say to one-third the length of the string, instead of the fourth—the identity of this string is fully lost, and it becomes the same as two other separate strings, of two-thirds and one-third each the length of the original, by each section dividing its vibrations in the center and fourth parts, precisely the same as did the original, which is shown in the fact that the sounds are the same in all their proportions as the original string, except that the two-thirds part has a principal sound a fifth (musical fifth) higher than the original, and the one-third part has a sound an octave higher than the two-thirds; thus becoming, in fact, the same as two new strings.

Third: If the point of contact is moved to one eighth the length of the string, which is the center between the nearest nodes, the whole string is instantly silent and dead. At that point, *and no other on the string*, the harmonics all cease *with* the principal, when touched sufficiently to stop vibration at that point; showing (I think, quite conclusively) that the four divisions above stated are *all* that the string naturally has.

Fourth: A still further proof of this is seen in the fact that the point at one-eighth the length from the end or bearing of a string is the proper point for concussion to produce the loudest and most powerful sound of which the string is capable, as that not only preserves the principal vibrations it assumes intact, but contact at that point is also an instantaneous aid to the string in making the subdivisions of vibrations which it seems compelled by the law of equilibrium to make. There are, however, some variations from this rule, which, from a superficial view, might appear quite practical, viz: the well-known fact that the point for concussion in piano-fortes, in the highest octave, is generally found to improve the tone by moving it nearer the bearing, say to about one-tenth or even one-twelfth the length of string. But this simply proves that the bearing place itself is too vibratory, and hence the necessity of moving the striking place for the hammer sufficiently near to answer the *additional* vibrations of the resting place.

There may be also some variations in the lowest octave of the instrument. But as that part is so far from any rule, by making the strings so much shorter in proportion to the other parts of the scale, and by loading them with covering to suit the notions of any ignorant manufacturer of that instrument, who may imagine that the laws of sound should conform to his particular ideas and benefits, and various imperfect modes of making and bracing the sounding-boards, connecting the bridges, &c., all of which have a direct effect upon the action and freedom of the string to give a full sound, it would be quite as useless as it is impossible to apply any law or rule to it.

DOES ALL SOUND MOVE AT THE SAME VELOCITY?

We extract the following from the London *Photographic News*:—At this season of violent thunderstorms, our readers will be interested to know of some observations which have recently been made respecting the phenomenon of thunder. It has generally been considered that sound moves at a uniform velocity of 1,142 feet per second; and in every book on the subject rules are given by which the distance of any source of sound, such as a firearm or a flash of lightning, may be ascertained by estimating the number of seconds and fractions of a second which elapse between the occularly-observed time of the occurrenee of the phenomenon and the hearing of the sound which accompanies it. Doubtless many persons have in this manner amused themselves by estimating the distance off which one of of the recent violent lightning flashes has been, and have taken comfort from the idea that, if a certain number of seconds have elapsed *after* the flash has taken place before the thunder is heard, they are safe from its effects; falling into the very common error of mistaking the cause for the effect. The Rev. S. Earnshaw has, however, been engaged in some extremely interesting mathematical investigations respecting the phenomenon of sound, and has arrived at the theoretical conclusion that violent sounds are propagated far more rapidly than gentle sounds, and that therefore all reasoning upon the distance of the flash, based upon the lapse of time between it and the thunder, is fallacious. Many instances of this fact are adduced in corroboration of the theory, in which the clap of thunder followed immediately after the lightning, when, judging from the distance which the latter was from the observer, there should have been an interval of many seconds duration. These and similar instances have induced the above-named gentleman to enter upon a mathematical investigation of the theory of sound, and he arrives at the conclusion, contrary to the hitherto universally received opinion, that there is no limit to the velocity with which a violent sound is transmissible through the atmosphere, provided the phenomenon which produces the sound be sufficiently violent. Hence, it is probable that there is no sound which is propagated faster than a clap of thunder, its genesis being especially violent. This theory seems also capable of explaining the rumbling, rolling noise of thunder. It is only necessary to imagine that the sound at its origin is broken up, either by partial interruption or reflection, into several sounds of different degrees of violence. They would thus be propagated with different degrees of rapidity, and would therefore not fall upon the ear, if it were at any distance off, with a sudden crash, but in a series of minor claps, or as a rattle. If this theory be true, the report of a cannon should travel faster than the human voice, and that of thunder faster than either. This, we think, could easily be put to a *crucial* test.

OLIVER EVANS AND THE FORM OF SHIPS

There are some men who live in advance of their age, and whose merits are never appreciated until they are numbered with the departed prophets. Of this class we have a brilliant example in Oliver Evans, of Philadelphia. In our opinion, he was the first inventor of the locomotive steam engine, and he actually constructed one which carried a load through the streets of Philadelphia in 1784-5. Another interesting fact in relation to his discoveries respecting the best form for ships has just been published by the *American and Gazette*, of Philadelphia, the editor of which states that he has lately examined drawings and specifications for a boat that was to be built for a son of Mr. Evans, in 1813, at Pittsburgh, Pa. It is stated that these diagrams represent a boat with the same long, sharp entrance, and fine lines at the stern as the fastest boats now running on Lake Erie. Oliver Evans' propositions and reasoning on the lines, proportions, resistances, and speed of boats were as follows:—

"The velocity may be increased one, two, three, or any number of times with no greater displacement of water, by simply elongating the bow the same number of times the ship's breadth of beam, and thus reducing or removing the direct resistance of the water forward of the ship. This direct resistance is, with a bow having an angle of 45 degrees, theoretically the same as to a square end or bow, because a mass of water corresponding in shape would, in that case, be driven forward of the boat. If the bow is carried forward six or ten times this half diameter of the ship, the calculation for resistance, at the bow alone, rises to high proportions. It is thirty-six times as great with the first-named form as with one six times as long, if the speed is increased six times also; and it is one hundred times as great with the square bow as with one ten times as long, the speed being increased ten times." After going through the demonstration that resistance is increased as the cube of the velocity of a moving steamship, he says:—"Because water opposes resistance as the cube of the velocity with which it is moved in any given time, therefore, to make a boat to run fast with little force we must construct it so that it will *move the water slowly while it runs fast.* Whereas, water is a heavy substance of great inertia, it cannot be put instantly in rapid motion, the sides of a bow ought to be a serpentine line, to make it part the water very easily at first, but faster until it comes near the middle of a bow, and then slower until it comes to the greatest width of the boat. And the stem must be as sharp as the bow and of the same taper and shape, to let the water close slowly at first, but faster near the middle of the taper and slower at the last, so as to leave no eddy or wake behind her. If these calculations be well-founded, it is impossible to make boats too sharp at the bow and stern to be driven by steam engines; therefore, if it be not too late, make the bow and stern of my boat very sharp, for it appears that the greater the velocity that we wish to run, the greater advantage in having sharp bow and stern. It appears that for every time we add the width of the beam to the length of bow, we can add one more velocity without moving the water sideways any faster, and if the bow be 2, 3, 4, 5, or 6 times in length of beam, we can run with a velocity 2, 3, 4, 5 or 6 times as fast as with the bow once the length of the beam, and move the water sideways no faster. This is a subject worthy of consideration."

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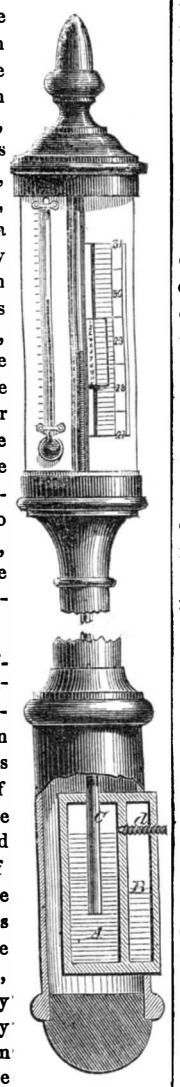
WOODRUFF'S IMPROVED BAROMETER.

Take a glass tube a little more than 30 inches in length, open at one end and closed at the other, fill it full of mercury, place your finger on the open end, invert the tube, insert the open end in a cup of mercury and withdraw your finger, and you have a barometer. The mercury in the tube will settle down till its weight just balances the weight of the air resting upon the surface of the mercury in the open cup. A column of air of the whole hight to which the earth's atmosphere extends (some 45 miles), a column of water about 32 feet in hight, and a column of mercury about 30 inches in hight, are all of the same weight—that is, if they stand on a surface of the same area. In order that the weight of the air in the open cup should hold up the mercury in the tube, it is necessary that there should be no air resting upon the top of the column in the tube; hence the necessity of having the upper end of the tube closed, and having no air in it. It will be seen that all air is excluded by the plan of filling the tube and then inverting it. The vacuum formed in the upper portion of the tube is called the Torricellian vacuum, from its discoverer, Torricelli, of Florence, who invented barometers in 1643. As the air is constantly moving about, gathering clouds, drinking-up water, and depositing water, the weight of a column of air in any place is constantly varying; and as the hight of a column of mercury which it will sustain varies with the weight of the column of air, the barometer is used to measure the weight of the air and to show these constant changes. The column of air over us also grows lighter as we rise above the level of the sea, hence the barometer gives us the means of measuring altitudes. It being necessary to have the cup of mercury always open, so that the air may rest upon it, if the barometer is turned down in a horizontal position the mercury will run out.



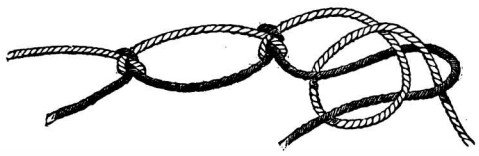
To prevent this spilling of the mercury, and thus to render the instrument portable, is the object of the invention here illustrated. The open cup or cistern, A, of the barometer is made of cast iron, and by the side of it, cast in one piece with it, is the reservoir, B; both of the vessels sealed at both ends. The glass tube, C, of the barometer is sealed air-tight in the upper end of the cistern where it passes through. A conical opening is made from the reservoir, B, to the cistern, A, which opening may be closed by the screw, *d*. Besides the usual supply of mercury for the tube and cistern, an additional quantity is placed in the reservoir, B, sufficient to fill the vacant space in the cistern. When it is desired to render the instrument portable, the screw, *d*, being turned partly out, the barometer is gradually turned down to a horizontal position, care being taken to keep the side on which the reservoir is situated uppermost, thus pouring the mercury from the reservoir into the cistern and completely filling the latter. The screw is now turned inward so as to tightly close the opening from the reservoir to the cistern, which, it will be seen, prevents the escape of any mercury from the cistern or the admission of any air into the tube. When the screw is turned in to its place, it completely closes the opening from the external air into the reservoir; but when it is turned back to render the barometer operative, the air is admitted by a flat place filed on the side of the screw for this purpose.

From the construction of this instrument, as well as from the ample testimonials, both of practical farmers and men-of-science, we are satisfied that it is really a good, practical, portable barometer.

The patent for this invention was granted to L. Woodruff, through the Scientific American Patent Agency, on the 5th of June, 1860, and for State rights, or for any further information in relation to it, persons will please address L. Woodruff & Co., at Ann Arbor, Mich.

DAVIS'S PATENT SEWING MACHINE STITCH.

Is it possible that the complicated knot represented in the annexed cut can be made by machinery? Such, indeed, is the marvelous power of modern mechanism. Hundreds of the stitches are made in a minute, and the same machine, by a very simple adjustment, is capable of making the ordinary loop stitch. This kind of stitch is especially adapted to harness work, and to any other



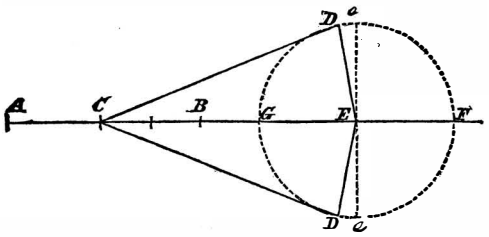
work where the sewing requires to be very strong and durable. It will be seen that each stitch is tied in a complete, firm, and permanent knot, so that even if each alternate stitch is cut, the work still will not rip.

The patent for this invention was granted to the inventor, James Davis, and any further information in relation to it may be obtained by addressing Henry C. Robinson (who owns a part of the patent), at Fayetteville, N. C.

THE CRANK MOTION AGAIN.

On page 102 of the current volume of the SCIENTIFIC AMERICAN, we published a communication from "A Mechanic," of Cincinnati, accompanied with the annexed diagram, showing an irregularity in the motion of a crank when turned by a reciprocating piston; the crank passing through a larger arc of the circle during one-half of the stroke of the piston than it does during the other half. Our correspondent asked how this could be; and we replied that his diagram answered the question very plainly. Professor Byrne, noticing this, sends us the following, which, to do him no injustice, we publish *verbatim*:—

MESSRS. EDITORS:—In your issue of the 11th of August, 1860, you appear to misunderstand "A Mechanic," who wrote to you from Cincinnati on the 6th inst., respecting "A Property of the Crank Motion;" and your correspondent seems to be ignorant of the fact that the line, C D, cuts the circle, G D F, and



does not touch it at the point, D. Let C G=*a*; G E=*r*=E D; and C D=*x*; any two of the three lines, $a+r$, $x\ r$, must be greater than the third.

$$A\ C=C\ D+D\ E—C\ E=(x+r)—(a+r)$$

$C\ B=C\ F—C\ D=a+2\ r—x$; but C being the center point, A C=C B;

$$a+2r—x=(x+r)—(a+r)$$
$$=x—a$$
$$2\ a+2\ r=2x$$
$$\text{Or, } a+r=x.$$

Hence, the triangle, C D E, is isosceles; that is, the angle, C D E=C E D; and hence the angle, D E C, is not a right angle. Nor can the point, D, be at the point, *e*, when C is in the middle between A and B; for C *e*, subtending a right angle, is always greater than C E, which subtends an acute angle.

To correct little errors is a very unthankful piece of work. I seldom meddle unless I am asked; this is an exception to my general rule. Yours, obediently,

OLIVER BYRNE.

Jersey City, N. J., August 13, 1860.

When we received our Cincinnati correspondent's letter, we examined it thoroughly; it seemed to us very simple; we thought we understood it perfectly, and we think so still. We fail to discover the evidence of that "ignorance" which Professor Byrne attributes to "A Mechanic," and we remain of the opinion that the diagram, in connection with the original letter that accompanied it, is a plainer answer to the question than any other demonstration can be. He states that the crank moves through a greater arc during the outer half of the stroke of the piston than it does during the inner half; and Professor Byrne painfully "corrects the little error" by demonstrating that it cannot be otherwise—that it must be so!

THE SETTING AND HANGING OF SAWS.

MESSRS. EDITORS:—I fancy I am better at sawmilling than writing letters for publication; but I would like to say a few words to Mr. Buxton, whose letter was published on page 66 of the present volume of your very valuable paper. I think he is in error in some things; although I agree with him as to there being many different opinions upon this topic. Those persons who cut lumber fast, however, do not differ so widely as those who do not; for those that cut lumber fast, or cut as much at each stroke of the saw as they might or should do, must "dress" the saw so that it will not touch or rub hard enough to cause heat, except at the points of the teeth. The *planing* of lumber should be done with some other tool than a saw; and my experience teaches me that lumber cannot be cut smooth and cut fast at the same time, nor cut smooth and straight and even in thickness.

I agree with the above-named correspondent as to the hanging of his saw, except that I would hang the lower end a little further back, as I would cut more at each stroke than he does, and would want the saw to be clear of the log going up. As for the top of the saw striking first, I think that cannot be so, and would be of no advantage if it did.

I cannot agree with him as to the setting of the teeth. I bend (or "set") them as close to the point as possible; the most of the clearance I get by making the corner or cutting edge project some, which I do with a tool or tools made for that purpose. I think the teeth will throw out the dust better to pass up-and-down in the middle of the cut, without touching the sides. The fibrous wood or sawdust only occurs when the teeth are blunt and present a thick edge; thus not cutting the wood off clear and clean, as a thin edge or slim tooth would; or when the saw is running out of line, in which case the sides of the teeth tear the fibers, as they cannot be kept sharp enough to cut them off.

I agree with him as to the holding of his file, but don't want the teeth to do anything going up; if it was important they should, the circular saw would never do any business, as it does its work but once, having but one motion.

Experience teaches me that lumber cannot be cut smooth and cut fast, nor cut smooth and straight and of even thickness or size, unless cut *very slow*. I do not approve of the two teeth to shave off the sides of the cut. My observations, for the last 10 years, convince me that all saws—gait, muley or circular—must run clear of the wood everywhere except at the immediate edges or points of the teeth. I have used one of each of the above-named classes of saws for about three years, during which time I have sawed all kinds of timber. I am now successfully running a 6-foot circular saw. W. MILLER.

Woodsonville, Ky., August 13, 1860.

CHARCOAL FOR THE TEETH

MESSRS. EDITORS:—Having recently perused an article bearing the above caption and published on page 120 of the present volume of the SCIENTIFIC AMERICAN, I wish to say a few words in relation to dentifrices in general. The teeth must be cleaned by chemical or by mechanical means or by both. Upon analysis it has been found that tartar and other substances usually adhering to and discoloring the teeth differ from them in substance only in the proportions of their constituents. Chemical agents affecting the tartar will hence affect the teeth also; the degree of their influence alone being different. An alkali or an acid is essential to remove tartar chemically; an alkali or an acid will certainly impair the teeth. *Charcoal* acts both chemically and mechanically; chemically by the highly concentrated alkali it possesses, and mechanically by the extremely brittle and cutting character of its particles, its purifying influence depending upon absorption effected by means of its cellular nature. The discoloration of the gum is the least of the evils occasioned by the lodgment of charcoal between the neck of the tooth and the free edge of the gum; it is indestructible and continues in this position, a foreign body wearing away the gum and exposing the neck of the tooth, which is not covered by enamel, and thus, in time, producing sensibility and decay. Soap is effective in cleaning the teeth in the ratio of its alkaline effects, and it is always prejudicial to the mucous membrane of the mouth, though this may not

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appear until after its protracted use. Peruvian bark owes all its cleansing influence to its mechanical application, a slight discoloration being its only chemical effect, except that its astringent and aromatic properties are agreeable. I would advise every one to cleanse his teeth as he would his door-plate, viz, by such mechanical means as will not injure them. Ordinarily a soft brush and cup of tepid water are sufficient; when something more effective is needed, prepared chalk may be used, say once or twice a week. When a still more effective agent is requisite, which may be once in several months, prepared chalk, with a minute quantity of powdered pumice-stone, sifted through cloth, should be applied *to the stained parts*, before the looking-glass, by means of a damp, soft rag or the softened end of a twig of green spicewood. But in this latter case, especially if tartar be present, the wise course is to procure the services of an intelligent dentist. The subject is important; there is no recuperative power in nature for the restoration of impaired teeth; and "gold fillings" and "gold plates" are but as wooden crutches after all. C. C. T.

Washington, D. C., August 15, 1860.

THE SCIENCE OF BREAD-MAKING.

MESSRS. EDITORS:—I am much pleased that the attention of some of your correspondents has been lately drawn to that important subject, *bread*. When Science is applied to render society healthier and happier, by lessening the ills of life, she becomes the handmaid of Virtue. When she acts in that capacity I rejoice in her progress; but when she is forced by interested men to assume an attitude not in accordance with the true intent and design of the creation, it is the happy privilege of the SCIENTIFIC AMERICAN and its correspondents to cut asunder the restraining band and leave fair Science free to resume her sacred mission.

Your correspondent, "L. K.," (page 52, this volume, SCIENTIFIC AMERICAN) is "inclined to think that saleratus and soda in our bread have more to do with the thin bones, rotten teeth and flabby looks of our children—large and small—than many would imagine." All he has stated on that point can be sustained by the testimony of the first chemist of our day, Liebig, and also by that of medical men of the first standing, such as Schwencke, Pitcairne and Orfila. They testify that "the carbonate of potash, soda and ammonia have a particular effect *in breaking-up the coagulating power of the blood, and inducing a diminished vital cohesion of the various textures of the body formed from it.*"

When interested parties spread forth to the public the virtues of medicinal saleratus, dyspepstic saleratus, &c.—bread raised without yeast and nothing left in the bread but pure salt—heed them not! And if medical men can be found so far behind the times as to testify in favor of the use of alkaline matter in food, leave them to be benefited by their own prescriptions! Good yeast is the best agent at present known to raise bread with; and when the sponge is set, it should be placed in a temperature of about 80°, and when it begins to work, it should be freely exposed to the air so as to allow the carbonic acid gas to escape with facility. When fermentation is carried on in a close space and the dough covered up, the quality of the bread is liable to be injured, for the more freely the gas is permitted to escape into the atmosphere the better will be the bread. As soon as the fermentation has reached a certain point (which bakers call "light"), knead and bake it; the heat of the oven stops fermentation, and over-fermentation makes sour bread. A certain degree of heat in the process of baking changes the starch of grains into dextrine, and gives that peculiar and agreeable flavor which *lively*, well-baked bread has. *Dead*, doughy bread is wanting in flavor, the heat of the oven being too low to develop the dextrine. Dextrine is soluble in water; starch is not. Thoroughly-baked bread is easier of digestion than when it is not well baked.

It would be an advantage to bakers to have a little closet attached to the oven, which should be ventilated into its chimney, and have a draft hole at the bottom of the door to regulate the heat and ventilate the interior space. This closet should be used for the reception of the sponge during the process of fermentation. Its advantages would be that the escaped gas would be carried off, and in cold weather, the fermenting degree of heat would be uniformly maintained. R. Y. R.

Lebanon, N. Y., July 26, 1860.

$1,000 REWARD FOR A WATCH!

The above reward will be given for any mechanical device (in watchwork) which shall possess all the advantages embraced in the arrangement and combination of parts patented by George P. Reed, of Roxbury, Mass., in 1857; these advantages are as follows:—

1st. The manufacturer is enabled to use a longer and wider main spring than can be employed in the usual way; the diameter and thickness of the watch being, of course, taken into consideration.

2d. The manufacturer is also enabled to apply a series of fine-toothed wheels and pinions, producing an easy and uniform action, and at the same time protecting them from damage by the violent recoil caused by the very common accident of the breakage of the main spring. The barrel being stationary, and the main wheel revolving with the winding arbor, the arbor and ratchet are left free to turn with the backward stroke of the spring, without exerting any force on the teeth of the main wheel.

3d. The barrel, being arranged within the pillar plate, is supported by that plate, thus preventing it from spreading or bursting by the breakage of the mainspring.

4th. As the winding arbor rotates in one direction while winding the watch, and in the opposite direction while running,, the stop-works are so arranged on the bridge or plate to accommodate such thickness and strength in those parts as to prevent danger of breakage or derangement. With revolving barrels, the stop-works are necessarily so thin and light that they are extremely liable to break or become disarranged.

5th. The securing of the stop-works to the bridge or plate brings the force, when brought up by them, upon the plate of the watch, thus relieving the train from all extra strain; while in watches where the stop-works are placed on the barrel, the force of the winding is applied on the train, giving an increased and unnatural motion to the balance, and, at the same time, endangering the teeth of the wheels and pinions, particularly if the divisions are fine and the watch is carelessly wound.

6th. As the stop-works are exposed on the plate of the watch, they constitute a good indicator of the time elapsed since the watch was last wound-up.

It will be seen that this improvement is particularly designed to obviate faults the more prevalent in the Swiss movements, or those without the chain and fusee. Practical experience having demonstrated that the fusee is not a necessary attachment, and that isochronal vibrations of the balance can be obtained by other and more effectual means, a preference will of course be given to a watch without an addition so cumbrous and liable to breakage and derangement.

It should be particularly observed that any arrangement or device claiming the above reward must be beyond all question of infringement. GEO. P. REED.

The following is a letter just received from the ingenious inventor who offers the above reward:—

MESSRS. EDITORS:—I noticed in a recent number of the SCIENTIFIC AMERICAN a short article on the manufacture and importation of watches; and there were some very just and timely hints thrown out in regard to the importance of improving the quality of American-made watches. This is a subject in which I have long felt very deeply interested. In the year 1854, having invented and patented a novel device for a compensation balance, I exhibited it to the Boston Watch Company, whose factory was then located in Roxbury, and was the only watch manufactory in America; and who are now doing an extensive business under the firm of E. Howard & Co., the senior partner being one of the founders of the above trade in this country. My improvement made a favorable impression on the company, and I was induced to devote myself to the improvement and manufacture of watches. The ideas which I entertained in regard to the successful manufacture of American watches was that, in view of the cheapness of labor in foreign countries (where the majority of watches are made), and of the great advantage which foreigners have over us in having been for hundreds of years established in the business and thus having passed through all the rudimental and experimental stages of the art, it was necessary for us to construct watches, if possible, on a novel plan which should be superior in its principles of construction and possess important advantages over those of foreign make, and that we should be protected from foreign competition by the security which the patent laws afford. To accomplish this object, I have most assiduously devoted the energies of my mind and body, much to the sacrifice of my physical health; and many have been the devices which I have periodically produced. You are doubtless aware that I have patented some of these novelties; others I preserve as curiosities. But as success has at last crowned my efforts, I feel that I am more than compensated for all my patient toil.

In the year 1857, I obtained Letters Patent for a novel arrangement in that part of a watch in which the motive power is applied, by means of which device I obtain several important advantages, in durability and strength, that have never been obtained in any other way. A detailed description of my improvement may be had by referring to the printed circular of E. Howard & Co., who are at present the sole manufacturers of my improved watches; the improvement lies in that part of the watch which constitutes the main feature of difference between the English and Swiss watches, and which gives to each its national characteristics, so far as the principle of their construction is concerned. In the English watches, the motive power is conveyed to the train or wheel-work by means of a chain and fusee; in the Swiss watches, the motive power is conveyed to the train directly by means of what is termed the "going barrel." But in my improved arrangement, I employ neither the fusee nor the going barrel. I use the stationary barrel, in combination with the maintaining power. I make no claim to the invention of the stationary barrel, as I am aware that such barrels are occasionally found in watches made a hundred years ago; but in all such watches the stationary barrel is very impractical, as they are minus the maintaining power, and are consequently liable to stop while being wound-up. But by the direct application of the maintaining power to the fixed barrel, I am enabled to obtain several very important advantages over the chain and fusee, and also over the going barrel arrangement. In view of these important facts, I hope my fellow-craftsmen will not consider me self-conceited when I claim that my improvement adds much to the character of American-made watches, and that in point of nationality it affords features of difference to distinguish them from foreign watches. It has been my earnest endeavor (in connection with Mr. Howard) to produce these watches—in all their parts—in a finished and perfected state; and we rely upon the opinion of all experienced and disinterested watchmakers to say how well we have succeeded. It is neither my intention nor desire to move heaven and earth for the sake of giving an impression to the public, that has no foundation in truth. Our watches will speak for themselves, and we are bound to make them in such a manner that they will do credit to the watch-manufacturing business in this country.

The foregoing portion of my letter may not be very interesting to you, but I trust that the remaining portion will be so, for the reason that I wish to employ your agency in procuring Letters Patent for me, for an improvement which I have recently made, and for the reason that the subject to which such improvement relates reaches far into the hidden principles of science. This improvement consists in the formation of the balance or hair spring, for watches, chronometers, &c., in such a manner that I am enabled to produce the *isochronal* condition or property in the spring with a greater degree of facility than by any process heretofore employed; that is to say, so far as I am able to ascertain by conversing with the most experienced and scientific watchmakers in this country, and by referring to the best-written works upon this subject. The isochronal adjustment of watches and chronometers is one of the most difficult and perplexing tasks ever undertaken by man, and the means by which it is accomplished are not understood except by the most experienced and scientific watch and chronometer-makers in the world. It is not my purpose to go into a detailed explanation of the invention at this time; in a few days I will send you the model with an explanation of it. GEORGE P. REED.

Roxbury, Mass., Aug. 25, 1860.

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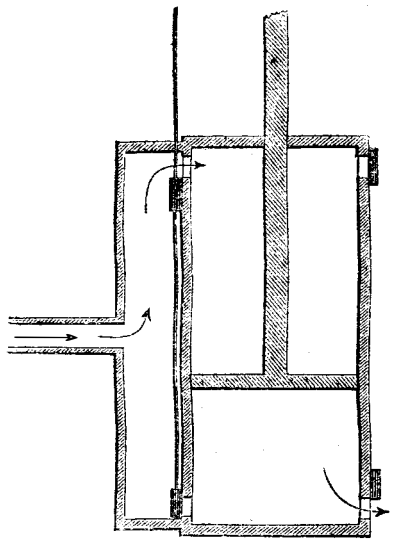
TALK WITH THE BOYS.

No. 3.—The Steam Engine.

"I am to explain to you, to-day, the principle of the steam engine, am I?"

"Yes, sir, if you please."

"Give me your slate, then. This is the main cylinder; it is made of cast iron, with the inside turned perfectly straight and true, and polished as smooth as



possible. A piston is made to fit into this cylinder, and its edge is packed with some elastic substance, so as to be steam tight. The piston rod, too, where it passes through the middle of the cylinder head, is also packed so that no steam can escape around it. In order to make the principle plain to you, I will draw the cylinder with two holes in each end; one for the admission of the steam from the boiler and the other for its escape after it has done its work. On one side of the cylinder is a box, called the steam chest. This is either cast in one piece with the cylinder, or is bolted firmly to it, and the joints are made steam tight. Valves are arranged and connected with the machinery so as to open and close the holes in the ends of the cylinder at the proper times. I have drawn the valves so arranged as to allow the steam from the boiler to press into the upper end of the cylinder above the piston, and to flow out freely into the open air from the lower end of the cylinder. This, you see, pushes the piston downward."

"But I do not see, sir, how the steam pushes the piston downward."

"You must understand that the boiler is not an open kettle, but a wrought iron cylinder, with closed ends, made perfectly tight and very strong, so that, as the steam is generated from the boiling water, it cannot escape, but presses along the pipe to the steam chest. As the heat is urged under the boiler, it enters the water and forces the particles of steam asunder with a force that increases constantly as the heat rises. You remember the picture that we were looking at of Watt, when he was first thinking about the steam engine, represents him pressing his finger upon the cover of his mother's teakettle, feeling the force of the steam as it lifted up the cover. He saw that there was *power* in steam, and he began to contrive some plan to make that power available. You see that the power which moves the piston of the steam engine is *heat* pushing the particles of steam apart."

"When the piston gets to the bottom of the cylinder, what then?"

"When it gets pretty near the bottom, the valves are moved to open the opposite holes, so that the steam from the steam chest may press into the lower end of the cylinder under the piston, and that which fills the cylinder above the piston may escape freely into the open air. Thus the piston is pushed back."

"And is this all of the steam engine, father? I thought it was a complicated thing, with a great mass of wheels and rods and all sorts of machinery."

"There have to be rods for working the valves, gages for ascertaining the depth of the water and pressure of the steam, a pump for forcing in the water, &c., but the main cylinder, with its piston, is the principal part of a steam engine; and that is all that I care to explain to you now. The first great lesson in learning is this—do not try to learn everything at once. Be satisfied to learn one thing at a time, but be sure that you learn it perfectly. Never be satisfied without *understanding* what you are trying to learn, thoroughly. The great sin, I think, of all of our schools, from the public primary schools up to the universities, is the effort to stuff the minds of the children too fast. The result is that they get a dim and confused notion of everything, and do not clearly, and certainly, and surely, *understand* any one thing. I have been perfectly astonished in talking with many of our college graduates, whom I had known as smart boys at school, to find how completely their minds were muddled on nearly all the subjects which they had studied. Physicians have objected to this severe study because it injures the body, but the reason why I object to it is that it destroys the mind. Sir Walter Scott said that four hours a day of mental labor was enough for any man, and we set our little tender children to dig into hard, dry studies from six to ten hours in a day. It is not strange that they get their little heads confused. Any child under twelve years of age will learn more in two hours than he will in six; and thirty minutes at a time is quite long enough for him to study. But these remarks are not exactly applicable to the steam engine. They are applicable, however, to the *investigation* of that as well as of all other matters."

"Have those holes in the cylinders any names, sir?"

"Yes, they are called 'ports.' Those which admit the steam into the cylinder from the steam chest are called the 'induction ports.' Can you tell what that is from, John?"

"No, sir; I know that 'in' is the same in Latin as in English, but I do not know what the 'duction' is from."

"What is it, Charles?"

"From *duco*, sir; to lead. Induction must mean leading in."

"The ports which lead the steam into the cylinder are called the induction ports, and the valves which close them the induction valves. What should the ports be called, Charles, that lead the steam *out* from the cylinder when its work is done?"

"Ex-duction, I should think, sir, or eduction."

"Eduction they are called, and the valves which close them are the eduction valves. In working engines, the valves are arranged differently from the manner in which I have represented them, my object being to explain only the principle to you."

"But, father, I thought you were going to tell us about carbonic acid in the steam engine."

"Yes, but I hardly expected to get to that part to-day. I must explain to you first the difference between a high and low pressure engine. The one that I have now described is a high pressure engine. You have learned enough for one time. A clear idea of the principle of the steam engine will do very well for one day; so we will adjourn till next Saturday."

THE YEAR OF GREAT METEORS.

Four great meteors have been seen in the United States within less than a year. At half-past nine, in the forenoon of the 15th of November, one passed over a portion of Connecticut, New York City and the southern part of New Jersey, in a S.S.W. direction. On the 21st of last April, one passed over Ohio, exploding with a loud report, and sending numerous large fragments to the ground. On the 20th of July the most famous of all rushed over this section in a S.S.E. direction. It was seen from Minnesota to the east end of Long Island, and far out at sea. On the 2d of August a very bright one passed over Tennessee. Of this latest of these startling visitors we have received the following description from a spectator; and we had written a long article to accompany the communication for our last number, but both the article and letter were "crowded out." It is probable that most of our readers have seen an account of the great Tennessee meteor before this time, but we publish our correspondent's graphic description in order that our paper may contain a full record of these phenomena in this extraordinary year:—

Messrs. Editors:—Our citizens were thrown into great excitement last night by a very large light that started in the aerial regions from the direction of the moon (southeast), and passed rapidly to the northwest, making a whizzing noise. The brightness of the light was no less than that of the noonday sun. This occurred about 10.30 P.M. Not a cloud was to be seen. The moon shone forth in all her brightness; but while this great light was passing, which was followed by a long trail of sparks, the moon was not to be seen any more than we can see it at mid-day. About five minutes after the light was gone out of sight, a loud report was heard like the report of a cannon, which was soon followed by another loud report. The reports echoed and reverberated for six or eight minutes, when the sound gradually died away like the rumbling of distant thunder. This was seen and heard at all the neighboring villages. Will some astronomer explain this grand and singular phenomenon? S. D. Stout.

Charleston, Tenn., August 3, 1860.

Our correspondent will find a very full history of these bodies, which are now attracting so much attention, in Vol. I. (new series) of the Scientific American, pages 354, 369, 379 and 383, and he will find our opinion of them on page 89 of the current volume.

THE FARMERS' CLUB ON LIGHTNING.

At a recent meeting of the Farmers' Club, held at the Cooper Institute, the question "why barns are so often struck by lightning, and a prevention thereof" came up for discussion, which proceeded in the following learned and able manner:—

The Chairman said he had known New York for over 60 years. When he first knew it, there were only 100,000 inhabitants, and now there are 1,000,000; and during all this time it was calculated there had not been anywhere near ten times as many houses struck as had been struck 60 years ago.

Mr. Carpenter thought it a very interesting subject, and that electricity shoots as often upward from the earth as downward from the skies.

A member from New Jersey thought that lightning rods ought not to be isolated; and, among other things, said that the greatest danger from lightning is before the rain falls.

Mr. Solon Robinson then said that he had been struck by lightning himself once, besides being knocked about generally in the world, and therefore thought he could speak feelingly on the subject. He was once sitting in a house with some females; the lightning struck the house, knocked over a good many kettles and pans, and killed a dog in the same room, and it was raining torrents at the time.

Judge Meigs said he had also been struck by lightning, and could therefore speak feelingly on the subject. He then related, in a jocular manner, a story of a young man who had got struck with lightning, and thought it was "the prettiest thing he ever felt."

A member from New Jersey then remarked that there were very few, or not any, steamboats, blacksmith shops or iron buildings ever struck by lightning.

Dr. Trumbull had often heard telegraph wires tingling with lightning, and afterward found the tops of the poles burnt and shattered, and the bottoms untouched.

Judge Meigs had examined trees in the country split by lightning, the grain of the splinters showing that the lightning came upward from the earth.

Dr. Trumbull said that the fluid always followed the grain of the wood, and would often take a circuitous course.

Mr. Carpenter begged to differ from him, and remarked that he had seen lightning go straight through a tree crosswise to the grain.

After a few remarks from a gentleman who spoke of his poplar trees as always being singled out by lightning among the tallest of oaks, and also a few remarks from Dr. Trumbull on the scientific importance of the subject, the meeting adjourned, pending the discussion.

We are anxious to know what more can be said on this important topic by the Farmers' Club. We hold our breath in suspense.

Inventions by Women.—The last number of *Le Génie Industriel* (published at Paris) has an illustrated description of an improvement in a complicated machine for stamping dies, invented by "Madam, the widow De La Chaussée." Almost every number of the French mechanical papers contains some account of inventions made by women.

Donaldson's Hominy Mill.—The address of the inventor of the above mill (illustrated and described on page 128 of the current volume) is *Rockford*, Ill., not Rockport, as erroneously published.

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CRITICISMS ON THE EXPERIMENTS WITH TURBINE WHEELS AT PHILADELPHIA.

On pages 130 and 131 of the present volume of the SCIENTIFIC AMERICAN, we published a letter addressed to us by the proprietors of the Littlepage water-wheel; but the great length of the communication compelled us to prematurely terminate the same. As the subject-matter involves questions of much importance to a large number of our readers, however, we now give place to the following *resumé*:—

MESSRS. EDITORS:—On July 16, 1859, the following notice was given to the world:—"These experiments are taken to determine the wheel that will be best adapted (all things considered) for our Fairmount Works. Two of the wheels approved of will be ordered at once." The tests *were* made—"after a fashion." The Stevenson wheel was declared to give out nearly 88 per cent of power; and the Kalbach and Geyelin wheels each 82 per cent. The Geyelin wheel is adopted. The Kalbach wheel is believed to be as effective as the Stevenson wheel, when made with the same care, and it is admitted to be "remarkable for its simplicity;" and that "two of these wheels placed upon a horizontal shaft might make a most desirable arrangement for our new works;" but again they say, "it might involve a risk of a failure." Why? Because "we have been unable to find any wheels now in operation of the aggregate power that we will require, or arranged in the above manner, or under similar circumstances to our requirements." That is equal to saying that, with all the knowledge that a civil engineer is supposed to possess, and with the "valuable assistance" of the other gentlemen, there was too great a risk in adopting any wheel without being able *first* to see just such a wheel as needed in operation—identical in shape, power and arrangement. Of course, it would not have taken the collective wisdom of many wise heads to have declared, with some degree of assurance, that such a wheel, applied in identically the same manner, would give a similar result. This could have been as well known before as after the tests.

There are five reasons given for *adopting* the Geyelin wheel, as now in use at Fairmount:—

1st. "*The Jonval wheels have always been esteemed among the most efficient wheels*," &c. This fact was as well known before making the tests as after. "Our experiments have also proved them the most effective," &c. This is particularly contradicted (as far as the Geyelin wheel is concerned, especially) by that part of the report which says that, if the Kalbach wheel had been equally as well-finished, it was believed that "it would not have been surpassed by any," without counting in its favor its extreme simplicity.

2d. "*They are best adapted for a small fall to produce a large amount of power with a low velocity, requiring less reduction of speed.*" That they run with a low velocity, we admit. The other points we do not; and would ask for the specific reasons for the assertion. We have already shown that a low velocity, when a fly-wheel is at all necessary, is a great disadvantage, causing, in a 250-horse-power wheel, an additional expense of $10,000, at three cents per pound, for cast metal. Regarding the necessity of a reduction of speed, it amounts to this: the speed of the Geyelin wheel has to be reduced from 40 to 16 revolutions; and that of two wheels on one horizontal shaft (stated to have about 80 revolutions), from 80 to 16. Now, if no reduction was necessary, the Geyelin wheel would have an advantage in this respect (which, however, is stated in the report, under the fourth reason, to be only an apparent advantage). But a reduction being necessary with any wheel, what difference is there of loss of power in reducing the speed by 2½ or by 5, so long as it is done with *one* additional shaft in each case? And it must be remembered that, with two wheels on a horizontal shaft, only two shafts are necessary (counting the wheel shaft as one) to connect the pumps, and that without any bevel gearing; whereas, in the arrangement of the Geyelin wheel at Fairmount, three are used, with bevel gearing.

3d. "*Durability and facility of repairs.*" If "remarkable simplicity," with support of the weight of wheel and gear by the water, requires more repair and is less durable than one of the $8,500 wheels, with a square foot of step under water, charred to coal by friction, then we must acknowledge ourselves in error.

4th. "*They can be constructed and connected to the pump at as small cost as any other form of turbine wheel.*" We have already shown that a pair of horizontal [illegible] wheels, requiring less weight of fly-wheel and one shaft less of gearing, are therefore cheaper on that score, and better adapted to be substantially connected to the pumps. Aside from that, the Kalbach wheels are cheaper as a consequence of their simplicity. The balance under this fourth reason is already answered.

5th. "*The favorable experience with the wheel on hand.*" Looking at its cost, it ought to have worked satisfactorily. It would be instructive, however, to learn the amount of cost of repairs since 1851, to pumps and wheel, &c.; we believe that the wheel cannot be charged with the bulk of these costly repairs, caused, no doubt, by the defective plan of the pumps; although we are not prepared to say how far the feeble effect of the fly-wheel, as placed, may have contributed to derangement.

The foregoing are all the reasons given for adopting the plan as used since 1851. The principal reason, however, seems indicated in this:—"The department, therefore, see no reason to *change* the plan of the works," &c. The plan, it seems, was fixed upon before the tests were made; and, if we are correctly informed, no wheel could have been adopted for the work substantially differing from the Jonval or Parker wheels, with perpendicular shafts, without tearing down work erected before and during the time the tests were going on.

The reasons given for *rejecting* the plan of a horizontal shaft with two wheels are three:—

1st. "*The apprehended reduction of fall.*" This has been noticed already.

2d. "*The loss in useful effect.*" We have stated that this is not satisfactorily shown. That a wheel will run less perfectly when propelled by a fluid offering a varying density, caused by a difference in distance from the center of gravity, seems self-evident. But the difference cannot be great; and is, in this instance, overbalanced by the other advantages given by such an arrangement. Two of Littlepage's wheels thus arranged on one shaft (using, together, 144 inches of water under 7 feet fall) are driving a sash-saw that is cutting cypress logs over 4 feet in diameter, with a satisfactory speed, which we regret not to have measured.

3d. "*The greater speed*," &c. This objection has also been noticed.

Finally, we find it stated that the Kalbach wheel is a *modification* of the Parker wheel. They seem to us almost as widely different as they can possibly be. Why is the Parker wheel borrowing excellence by claiming kindred with the Kalbach wheel?

LITTLEPAGE & CREUZBAUR.

Austin City, Texas, August 2, 1860.

ATTRACTION AND CONDUCTION.

It seems very difficult to root out the long-settled popular opinion that lightning-rods are not simply conductors; they do not perform the office of attracting and thus drawing the lightning. One says: "if an iron rod has no attractive power for lightning, would not wood, or any other substance, answer just as well for lightning conductors?" In order to correct such views, we will state at the outset that *attraction* and *conduction* are two entirely different principles of operation. The rain which falls upon the roof of a house is conducted to the ground by a pipe; but it is not the pipe or conductor which causes it to flow to the ground, but the attraction of gravitation. It is just the same in principle with lightning and electric conductors. A magnet possesses attractive powers and it holds fast those bodies which it attracts, but lightning-rods do not hold fast the electric fluid; their functions are entirely different; they simply transmit the electric fluid through them. Copper is far superior to steel as a conductor, yet it does not possess magnetic attractive properties. No person can tell why it is that one metal is a better conductor than another, or why glass is not a conductor of electricity; we only know by practice and experiment that such is the case. Silver is the best of all conductors; and if the Washoe mines, in California, should continue for many years to yield the large amounts of silver which are stated to have been obtained from their ores, we may yet have the pleasure of beholding silver, instead of old, rusty, iron rods projecting above the roof of every mansion and barn in our country.

A COLUMN OF VARIETIES.

A bill has been laid before the Corps Legislatif for laying down [illegible] between France and America.

Wheat has great vitality. It has been [illegible] Professor Wartman to a temperature of 100° below zero, and by Professor Henslow to a temperature of 210° above zero, and yet it afterwards germinated.

When water is thrown upon a red-hot plate of metal it separates into minute spheroids, the heat of which is always 176° Fah. (56° below the boiling point). This is very remarkable when it is considered that the temperature of the metal itself may be about 2,000°.

The coal oil fever has reached Canada West. Quite a number of oil wells have been sunk in the valley of the river Thames, and there is a large district of country where the soil appears to be completely saturated with the oil. It appears to be easy to account for the oil wells in Pennsylvania where there are large coal fields, but there are no such sources of coal oil in Canada West.

The British steamer *Fox* (which has been sent on the surveying expedition to the Arctic seas for the purpose of ascertaining the proper route for Shaffner's new Atlantic telegraph line) had reached the Faroe Islands, according to the latest news from Europe. The report of the survey thus far is very favorable to the enterprise.

A steel steamer, 93 feet in length, 19 feet 6 inches in breadth, and 8 feet 2 inches in depth, with engines of 60-horse power, was recently launched at Middleborough, England. The plates of the hull are but 3-16th of an inch in thickness. She combines the essential qualities of lightness and great strength.

The streets of New Orleans are now being paved with blocks of northern granite laid diagonally. On these the tracks of the street railroad are being put down by the slow and laborious process of chiseling grooves in the blocks as they lie on the ground. Hundreds of men are scattered along the streets, cutting the grooves, each with his little awning above him.

If a block of iron, weighing 100 lbs., is raised to a white heat, and a continued stream of steam brought into contact with it, an increase of 30 lbs. will be made to its former weight. The heated metal decomposes the steam and absorbs about 30 per cent of its weight of oxygen.

The total expenditure of the United States Post-office for the past year was $14,964,493; the revenue was only $7,968,484, leaving a deficit of $6,996,009. In England, the General Post-office revenue of 1859 was £3,197,258 (about $15,986,000), while the expenditures were within one-fourth of the income. Owing to the density of the population in England, the expenses for conducting the postal business are very much less than in America. The number of letters carried, in 1859, throughout the United States, was 222,482,000; in Great Britain, it was 545,000,000.

A series of new experiments have recently been tried at Venice, by a physician, to test the powers of the sesqui-oxyd of iron as an antidote for arsenic. Certain doses of arsenic were first given to five dogs, all of which died, as no substance was administered to counteract its effects. Equal doses of the poison were then given to twelve other dogs, and doses of hydrated sesqui-oxyd of iron were administered soon afterwards. Only two of the twelve dogs died, thus affording proof of the neutralizing powers of the iron oxyd.

Many soaps are colored with mineral oxyds. Vermillion is used to produce rose soap, artificial ultramarine to make blue, and ochres to produce browns. Tablets are made by placing a soft mass of soap into a mold, fixed in a lever press, and composed of a top and bottom die, which fit into a loose ring; by pressure, the shapeless mass takes the form of the die, and is at the same time embossed on the top and bottom of the cake. That which is called the honey toilet soap contains no honey, and is perfumed with the essence of citronelle. The addition of a little honey to soap renders it very well adapted for healing simple cutaneous eruptions.

The experiments at the Metropolitan Mills in this city, which, if the statements are to be believed, seem to indicate so clearly that there is no economy in using steam expansively, are attracting a great deal of attention among engineers. If this should prove to be the case, the world has certainly been under a most extraordinary delusion in regard to the matter.

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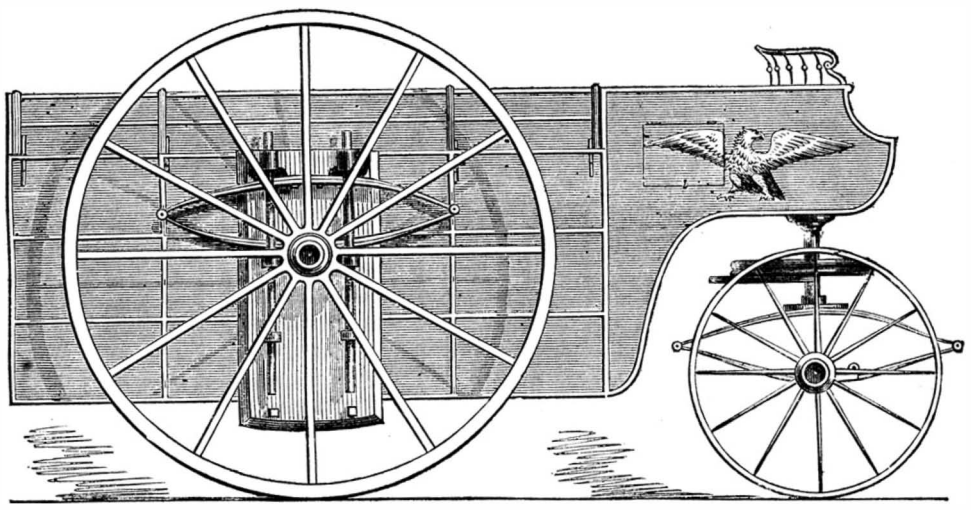
IMPROVED MODE OF HANGING WHEEL VEHICLES.

Carriage and wagon makers have long been desirous of finding a plan for bringing the bodies of carriages near the ground, and which would still permit the employment of large wheels. For this purpose bent axles have been used, and the wheel has been placed upon a short axle fastened to the side of the body; but this latter plan prevented the employment of springs. The plan which we here illustrate (invented by Charles Bradfield, of Jersey City) is an improved mode of fastening the short axle to the side of the body, which permits the introduction of springs—either spiral, elliptical or india-rubber.

Fig. 1



BRADFIELD'S MODE OF HANGING WHEEL VEHICLES.

The plate, *a* (see Figs. 2 and 3) is bolted firmly to the side of the wagon. Upon this plate are flanges, *b b*, projecting outward, with holes in them for the guide rods, *c c*. To the rods, *c c*, is rigidly secured the bar, *d*, which is formed in one piece with the axle, *e*. Above the bar, *d*, is placed the spring of whatever form, pressing the bar downward, and thus taking the support of the body. Figs. 1 and 2 represent the mode of placing elliptic springs, and Fig. 3 the mode of applying spiral springs or those of india-rubber, either of which

Fig. 3

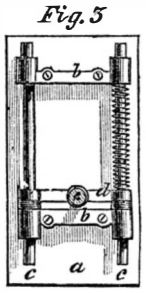
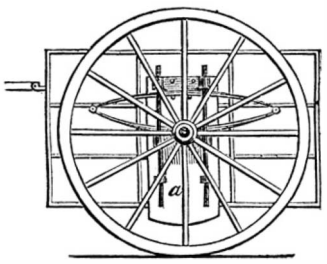


Fig. 2



latter are placed around the guide rods. Fig. 1 illustrates the mode of placing the body, so that the principal portion of the weight may come upon the large wheels, which are made heavy to sustain it; the smaller guide wheels being made light, as they have but little load to support. Elliptic springs are deemed the most suitable for all heavy vehicles, but the spiral or rubber springs answer a good purpose for hand-carts and children's wagons, and are very cheap. To prevent the plate, *a*, from being turned from the perpendicular, two iron rods are passed across under the bed of the wagon, connecting the bottom ends of the two plates together.

While this mode of hanging bodies is considered especially suitable for express wagons and others designed for loads, it is thought also to be well adapted for gigs and a variety of other vehicles.

It has been practically tested and commands the approval of carriage-makers. W. Lloyd, the extensive and well-known manufacturer of Newark, N. J., says:—"After having built a wagon under your patent and seen the principle well tested, I cannot hesitate to pronounce it a most valuable discovery or improvement over the old method of suspending the bodies of wheeled vehicles." The manifest advantage, besides the lowering of the position of the body, being the great simplicity of the construction.

The patent for this invention was granted, through the Scientific American Patent Agency, on August 16, 1860, and further information in relation to it may be obtained by addressing C. Stewart Bradfield, at No. 423 North Ninth-street, Philadelphia, Pa., or Charles Bradfield, No. 16 Exchange-place, Jersey City, N. J.

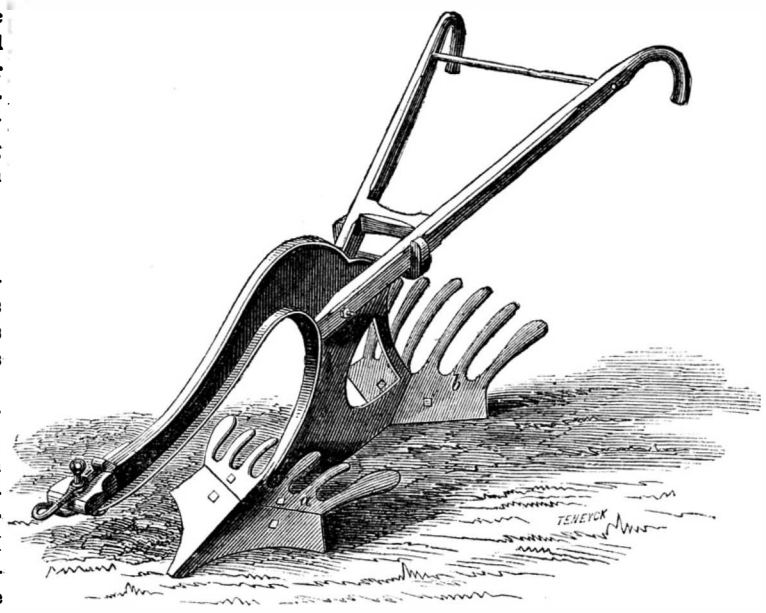
AN INDIA-RUBBER SADDLE SUGGESTED.

MESSRS. EDITORS:—If it has not already been done (and I do not think it has, for the inventor would surely be sufficiently alive to his own interest to have brought it before the people in the columns of your valuable paper), why does not some inventive genius "get up" a saddle of inflated india-rubber? It surely could be done; and he that will do it will not only confer a benefit upon horsemen, but will add a new article to the "stable-hold," and make money thereby. Among our hills, where buggies cannot be used, we have to suffer with the old "hog-skin" saddle, which, to a constant rider, is but little superior to a *rail*. I am sure that a Yankee inventor can design a saddle that will be a luxury. A. T. H.

Monteiey, Ky., August 13, 1860.

IMPROVED POTATO-DIGGER.

This improvement consists in the employment of two double moldboard plows, *a* and *b*, both on the same level at bottom, and each having teeth attached to it in the rear, as plainly shown in the engraving. The moldboards are made flat and short so as to slide under the potatoes, when the teeth lift them out; the forward plow merely loosening the ground and raising the potatoes in it somewhat, while the back plow completely throws them upon the surface.



BAWDEN'S IMPROVED POTATO-DIGGER.

The inventor says:—"It is well known that the passage of a toothed implement, such as a combined rake or screen and plow, through the ground, so as to open the hills or drills of potatoes, will cause the latter to be elevated near the surface, the earth falling more quickly. One plow and rake, however, will not completely disinter the potatoes; the operation must be repeated in order to fully and thoroughly accomplish the work, and to this end I employ the two plows, provided each with the teeth or prongs, as shown and described."

The perfect simplicity and efficiency of this implement seems to place it beyond the reach of improvement, unless some one can invent an attachment which will pick up the potatoes and deposit them in a basket.

The inventor of this improvement is John Bawden, of Freehold, N. J.; the patent was granted, through the Scientific American Patent Agency, on May 8, 1860, and further information in relation to the matter may be obtained by addressing Gilbert Combs, the owner of the patent, at Freehold, N. J.

A PANORAMIC STEREOSCOPE.—A gentlemen, rejoicing in the euphonious name of S. Czugajewicz, has recently taken out a patent for some improvements in stereoscopes. The invention consists of a compound stereoscope, in which general or panoramic views of boulevards, streets, banks of rivers and coast lines, monuments, sea views, &c., may be displayed by means of the gradual unrolling of one or more endless slides or bands carrying pictures. It is immaterial whether the pictures represent one side of a street, &c., or whether they are in perspective, and represent both sides thereof. The distinctive feature of this invention is the adaptation to stereoscopes of one or more symmetrical, independent, movable, endless bands, on which are right and left hand halves, or corresponding parts of a stereoscopic panorama, or succession of pictures. The following is the construction of the instrument:—The top thereof consists as usual of two lenses or eye-glasses, and the bottom thereof is mounted on a box containing rollers, on which are wound the before-mentioned endless slides or bands on which are printed, pasted, or otherwise appropriately attached the views or pictures in panoramic succession; also a train of wheelwork for setting the aforesaid bands in motion. The aforesaid bands and corresponding parts of the pictures thereon, are brought under their respective eye-glasses upon a flat stage or platform over which the bands pass, so that, when set in motion, a panoramic stereoscopic view or picture is thus obtained. The description of the instrument is not very clear, we fear, to those who are not acquainted with the effect. We have, however, seen a similar instrument, and can assure our readers that nothing can surpass the beauty and interest of a beautiful stereoscopic panorama moving before the eyes of the spectator.—*Photographic News.*

NEW AND CHEAP BLASTING POWDER.—*Le Génie Industriel* states that a patent has just been taken out in Belgium for a simple method of making blasting powder from spent tan bark. It says that while the price of this powder is less than that of gunpowder, it takes but one-seventeenth part as much to produce the same effect. It is composed of 52½ lbs. of nitrate of soda to 72½ lbs. of waste tan bark, and 20 lbs. of pulverized sulphur. The nitrate of soda is dissolved in a sufficient quantity of boiling water, and the tan bark added in a manner to completely impregnate it with the solution, after which the sulphur is added in the same way. The mixture is taken from the fire and thoroughly dried, when it is ready for use. If it is wet, it does not permanently injure it, but on being again dried is as good as ever. If fired in the open air, it causes no explosion, but is very efficient for blasting when confined in the usual manner. It is not suitable for use in guns or cannon.

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VOL. III., No. 10....[NEW SERIES.]....*Sixteenth Year.*

NEW YORK, SATURDAY, SEPTEMBER 1, 1860.

THE ACCUMULATION OF GOLD AND ITS EFFECT UPON COMMERCE AND SOCIETY.

THE attention of several writers on political economy has lately been attracted towards the probable results which may follow from the great quantity of gold which has of recent years been thrown into the currency and commerce of the world. The chief of these writers is, perhaps, Michel Chevalier, a member of the Institute of France, whose works have been translated into English by Richard Cobden Esq., and criticised in the Edinburgh *Review*. The leading idea running through the whole work of M. Chevalier is that the value of gold must fall, and that many evils will result for some years from its depreciation.

The facts which form the groundwork for concluding that a fall in the value of gold must take place may be thus stated. At the beginning of the present century, the annual product of gold which arrived to augment the metallic wealth of Christendom amounted in round numbers to about $15,000,000; in 1848 it rose to nearly $40,000,000; at present it is about $190,000,000. The total quantity of gold obtained on the whole continent of America from the era of Columbus to the discoveries in California, amounted to $2,000,000,000; in every single year about one-tenth of this amount is now being poured into the lap of commerce. This great supply surely cannot continue much longer without reducing its value.

With all the great influx of gold since 1848, it has depreciated but little, if any, in value, but it is certainly a reasonable conclusion, that if those supplies continue, the value of the article must fall. It now becomes an important scientific question, so far as it relates to the gold-producing rocks, whether they will continue to yield in such great abundance, or become poverty-stricken the longer they are continued to be worked. On this head we have some peculiar opinions from that distinguished geologist, Sir Roderick Murchison. In an address delivered in London, in the year 1857, he asserted that the yield of gold in Australia would be constantly on the decrease. He said:—"All gold veins in the solid crust of the earth diminish and deteriorate downwards, and can rarely be followed to any great depth except at a loss to work them." Again: "as the richest portions of the gold ore have been aggregated near the upper portions of the original vein, stones, so the heaps of gravel or *detritus*, resulting either from powerful abrasion, or tear and wear of ages, and derived from the surface of such gold-bearing rocks, are with rare exceptions, the only materials from which gold has been or can be extracted to great profit. The real problem we have now to solve, is how much time will elapse before the gold of Australia is finally riddled out of these heaps or basins, or extracted from a few superficial feet of vein-stone." The same distinguished geologist also asserted that quartz mining was unprofitable unless working near the surface, and that "auriferous quartz veins will soon be exhausted for all practical purposes, when the upper portions shall have been quarried out." Since that period, however, Sir Roderick has greatly modified his opinions; he has stated in a late edition of one of his works, that those sentiments were uttered without taking into consideration the new and improved machines and processes that would be invented for recovering the gold; and he uttered a prophecy in the following words:—"The improved application of mercury may indeed liberate a notable quantity of ore from a matrix of apparently slight value and thus set at nought the experience of ages." Such a discovery in the application of mercury has been made since that eminent geologist penned the above quotation. On page 41, Vol. II. (new series), SCIENTIFIC AMERICAN, we described the new method of treating pulverized gold ores with mercury (under heat) in water, for which a patent was issued to Messrs. Fell and Wykoff in July, 1859, and by which three times the quantity of gold was obtained from the same ores, that had been secured by the old mode of cold amalgamation. Since that period, we have had an opportunity of witnessing the process conducted experimentally, in this city, upon some ores from the Melville mines in Virginia, and gold at the rate of $120 to the tun was secured, while by the old mode, it was stated that only from five to seven dollars per tun could be taken out. This process we understand is now followed on a large scale at the Melville mines, Va., and the Gold-hill mines, Ga. We may therefore reasonably conclude that by the discovery of improved processes for recovering gold from its ores, and by improved machinery, the present supplies will continue to augment rather than diminish, for many years. What then will be the result? If more gold is obtained than is required for the currency of the nations, and for works of art, such as plate and jewelry, then, like every other commodity, the price of which is regulated by "demand and supply," it must fall in value. M. Chevalier concludes, from reliable statistics, that there is not a sufficiently increased demand for gold in the arts and manufactures to absorb the surplus. Indeed in England, the fashion of using gold in plate and ornaments is declining, as it always does among intellectual and cultivated people. M. Chevalier believes that the time is nigh at hand when gold will go down in value, "like a descending parachute," and he is of opinion that, "the industrial classes (meaning mechanics, artisans and laborers) will suffer during the progress of depreciation, because the prices of the commodities which they consume will constantly rise in advance of the rise of wages." This is stated to have been the result in a small degree in France already. But the injury to the working classes from such a cause must be of very temporary duration, because wages are regulated by the demand and supply of labor. In England, the wages of some classes of mechanics and artisans, have been on a steady rise for sixty years past, while those of other classes have generally varied during that period. Eighty years ago, the common wages paid to persons engaged in linen bleach-works in Scotland and Ireland, was sixpence sterling per day, and we have conversed with an old man who said this had been the rate of his wages in early life for three years. Now the same class of work-people are paid, at least, from twelve to fourteen shillings per week, or four times the old rate of wages.

The Edinburgh *Review* admits that a fall in the value of gold will effect adversely those who have fixed salaries upon endowments, also mortgages whose incomes are based upon a fixed rate of interest. In America, the great influx of gold from California appears to have been a positive benefit, by increasing the quantity of a standard circulating medium for commerce. There has not been and there is not yet, a sufficient circulation of metallic coin throughout the wide extent of our country. In most of the rural districts barter is still quite common—the exchanges of articles are not made in cash. In every country where the standard circulating medium is sufficient for the daily wants of commerce, the barter of goods is unknown; we have therefore an extensive field still open for absorbing the surplus supplies of gold, and of this field M. Chevalier has been partly ignorant; how could it be otherwise? We therefore do not expect the value of gold to fall quite as soon as M. Chevalier expects.

Currency is not one of the primary wants of man, but is introduced in a somewhat complicated state of society. It is simply the vehicle for effecting the exchange of other commodities, one man's wheat for another man's cloth, &c. The increase in the quantity of any particular metal which is used for currency would merely require a greater number of pounds of the metal to effect the exchange of a given amount of commodities. The tendency of the increase of gold is certainly to make this metal less valuable in proportion to other things, and wherever gold is the standard currency, to raise the prices of other things. The only permanent evil, however, resulting from this depreciation of its value, is the inconvenience of transporting a larger number of pounds of the metal to make the same amount of payments. If the depreciation in the value of gold should be carried to such an extent as to render it unsuitable for currency, then platinum, or some other metal would be adopted for currency in its place.

NEW STEAMERS CROSSING THE ATLANTIC IN FIVE DAYS.

The London correspondent of the New York *Herald* states that there are two parties now engaged in constructing steamers which they say can cross the ocean in five days. "Within the next five years," he says, "the voyage between New York and England will be made in less than five days. The basis of improvement are the modes of propulsion, style of engine, and form and size of hull. It is now reduced to a practical certainty that steam can be heated up to 600° Fah., and that alone is going to effect a saving of motive power amounting to more than four-fifths."

This correspondent is certainly an enthusiast of the "first water," and deserves the credit of having more faith in future improvements than common mortals. To make a voyage across the Atlantic in five days, it only requires an average speed of 25 miles per hour. Is there any man so strongly imbued with scepticism as to disbelieve in the possibility of this result being yet accomplished? We know it is all rhapsody to expect a saving of 80 per cent in fuel by using steam of 600° temperature; but every man has a perfect right to suit his own temper in such notions.

The following is the kind of ship which is described by this correspondent to make the five days' voyage:—"Now, what is the reason that we cannot have a steamboat that shall combine all the excellencies and advantages of your Hudson river steamers and the *Great Eastern?* The latter steamer draws too much water. When there is such a vast displacement necessary, of course there is a great expense or loss of power. The *Great Eastern* is about 700 feet long and 90 broad. What would you say to a steamer 1,000 or 1,200 feet long and 180 or 200 in breadth? Construct such a vessel with nearly or quite a flat bottom, and to draw (not to exceed) 10 feet of water, with two or three pairs of paddle wheels, and would there not be an economy of power that would reduce the cost of carrying passengers at least one-half? The craft would be something between a boat and a raft. It would ship a sea now and then in rough weather, but it would not roll or pitch; and a very high speed could be attained. With two such steamers to cross the Atlantic in five days, and carry 10,000 or 12,000 passengers, at $25 and $50 each, they could form a line to run every 10 days, and they would break down every steam line now existing. I do not say that this is soon to be carried out; but I beg leave to hint that I believe it would be practicable."

"Shipping a sea now and then in rough weather"—who would complain of that, in making a five days' voyage? Why, any sensible person would take a ducking thrice every day to enjoy the luxury. How a vessel 1,000 feet long and 180 feet broad can be made to run across the Atlantic in five days, we are not informed; but the *Great Eastern* would be a very suitable experimental subject. By *razee-ing* her, the draft of water could be reduced to 10 feet; and, as her bottom is flat, of course it would just meet the requirements of the case. The London correspondent of the *Herald* is certainly a fellow of extended ideas; but we must tell him that he is a little second-hand in his fast ideas. Such a ship was projected more than a year ago in the city of Buffalo, N. Y., and if it is not yet fairly underway, it is not for want of confidence in its success by its author. But "there's a good time coming."

THE SEWING MACHINE FIGHT.—In our last number we alluded to the great sewing machine cases of Wheeler & Wilson *vs.* Sloat and others. The importance of the cases and the general interest expressed in the decision of Judge Nelson have induced us to resolve to publish it in full; but, owing to a great press of matter upon our columns, this week, we are compelled to defer doing so until our next issue.

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OUR WASHINGTON CORRESPONDENCE

Rival Sewing Machines—Elias Howe's Extension

WASHINGTON, D. C., August 18, 1860.

MESSRS. EDITORS:—The application of Mr. Elias Howe, Jr., for an extension of his famous sewing machine patent is now before the Patent Office. All the papers relating to the case are now filed, and the question is engaging the attention of the Examiner who has charge of that class of inventions for an opinion. The extension naturally meets with much opposition, but the case is to be decided upon the submitted papers without oral argument. Walter Hunt's old machine, invented in 1843, and Howe's original model are now being examined. I have seen both, and have come to the conclusion that Howe's model is more perfect than has been represented. It is a practical sewing machine, having a curved vibrating needle, a shuttle and feed-motion. It contains all the elements of the successful sewing machines, and is very neat in its mechanical construction. It impressed me most favorably, although it is far from being as perfect as the sewing machines which are now manufactured. Hunt's machine is a very crude piece of mechanism, and is broken in several places. The parts remaining show that it had a vibrating needle, a feed-motion, and a shuttle for producing the lock-stitch; but the whole affair is so poorly constructed that it does not appear to have ever been practically operative. Hunt was a very ingenious but unfortunate man; in this case, however, he seems to have very nearly gained one of the brightest prizes ever won by an inventor. After the Examiner has fully examined and made a report on the application, the Commissioner of Patents will then give it a thorough investigation, and make the final decision; and, as he has the best means of examining both sides of the question, his decision will be looked-for with great anxiety.

As this is one of the most important extensions that has ever been applied for, I send the foregoing as public information in relation to its condition in the Patent Office. M.

[The letter of our correspondent clearly states the condition of Howe's extension case at the time when the letter was written. Since that date, we understand that the Examiner has reported the case to the Commissioner, and fully sustains the novelty of Howe's invention; but very properly leaving the question of remuneration to be decided by the Commissioner. Applications for the extension of patents under the law are presented and adjudicated upon certain rules made and provided for such cases. This case is no exception to the rule, and must be decided according to the evidence presented; the Commissioner being judge of both law and fact, and no *exparte* statements should have any weight in determining the issue. The position of the SCIENTIFIC AMERICAN is so well understood, in cases of this character, that we need not re-state it.—EDS.

HOLMES' RULE FOR SETTING STEAM BOILERS.

In accordance with the request of a correspondent, we republish from page 315, Vol. X. (old series), of the SCIENTIFIC AMERICAN the plan adopted by Joseph E Holmes, of Newark, Ohio, for setting steam boilers.

"Our boiler is 48 inches in diameter and 30 feet long, with two 17-inch flues. This boiler is set with four vertical bridge walls at about equal distances apart; the first is built within 4 inches of the boiler, the second 4½, the third 5. and the fourth 5½ inches. The heat passes under the boiler to the back end, thence forward through one of the flues, and back to a stack 34 inches square inside, and 85 feet high. This gives the heat a passage of 90 feet under and through the boiler. Our draft seems perfect, and it is one of the most controllable boilers I have ever seen."

THE PHILOSOPHY OF MUSIC.—On another page of the present number will be found a very profound disquisition on the "Mechanics and Mathematics of Musical Vibrations," written by Spencer B. Driggs, Esq., of this city, the inventor of many improvements in piano-fortes, one of which is known extensively as the "Drigg's attachment." We publish the article for the benefit of those of our readers who are interested in acoustics and the philosophy of music; it has excited the interest and extorted the approval of some of the most eminent among our professors of mathematics and natural philosophy, and will be found to evince great research.

LITERARY AND SCIENTIFIC NOTICES.

HISTORY, THEORY AND PRACTICE OF THE ELECTRIC TELEGRAPH.

This work is the first complete, reliable and accurate treatise on the science of telegraphy that has appeared from the American press. It is written by a practical man—George B. Prescott—who has had over 13 years' experience as an operator and manager of lines in this country, under the four great systems at present in use here. Most works heretofore published on this subject have been written by men possessing merely a *theoretical* knowledge of the art; and hence they have abounded in inaccuracies, some of which are of the most amusing character. No previous work contains a description of the Hughes and Combination systems, which are the most recent and improved, and have been widely introduced within the last three years. The work commences by explaining the general principles of electricity and of the telegraph, followed by a minute and clear description of all the different systems in practical use. Then the subject of subterranean and submarine lines is discussed, and a full account given of the laying and working of the Atlantic cable, together with every word that was transmitted through it, even to the private messages of the operators, which have been published in no other work. This is followed by an account of the progress and various applications of the telegraph; the construction of the lines, and their disturbances from atmospheric electricity; a chapter of miscellaneous information and amusing incidents connected with the art; and, finally, a summary of early discoveries in electro-dynamics and the application of galvanism. The work is handsomely "got-up," and richly illustrated; it will be found interesting and useful, as well to the general reader as the man-of-science and the practical telegrapher. We hope it will obtain the extensive sale which it deserves. The publishers are Ticknor & Fields, of Boston, Mass.

MEDICAL USES OF ELECTRICITY.

Ticknor & Fields, of Boston, Mass., have just published an octavo volume of 700 pages, by Alfred C. Garratt, M.D., Fellow of the Massachusetts Medical Society, on electro-physiology and electro-therapeutics, showing the best methods for the medical uses of electricity. The perusal of this work has produced the impression on us (which, perhaps, the author intended to produce) that electricity is a very powerful agent in the treatment of disease, and that it ought not to be practiced by any one who is not thoroughly familiar with its varied and peculiar effects. In some cases, the current requires to be passed in one direction; in others, in the opposite direction; pains and spasms are produced by sudden interruptions of the current—heat and blisters by its constant flow; and the various effects are very numerous. One of the simplest applications of electricity for curative purposes is its use in surgery, for heating a platinum wire red-hot, which is then employed as an actual cautery for burning parts which cannot be reached by a wire heated in any other way. As a specimen of the physiological effects of electricity, we extract the following account of an experiment performed by Humboldt, 70 years ago:—

"Alexander von Humboldt, in order to test accurately the physiological effects of *immediate* galvanism, says he caused a blister, of the size of a crown-dollar, to be placed on each of his own shoulders. They occupied the upper and outer portion of the deltoid muscles. When those two blisters were opened, he says, there trickled down his back the ordinary clear serum, which dried on the skin, showing nothing but a delicate gloss from the contained lymph, and which was readily washed off with simple water. The right blister was first experimented upon by placing over it, in immediate contact with the raw place, a small plate of silver that mostly covered this denuded blister; but there was neither felt nor seen any effect until the similar application of a plate of zinc over the other blister, and metallic contact was made between them; when, at each contact, there was a heavy, dull sensation of burning. This sensation, he says, sensibly increased from half-minute to half-minute. But what was the most surprising to all present, was the *appearance* of the now flowing secretion from the blisters; it was not transparent, nor was it bland, as before; but, in the course of a very short time, it had become reddish, producing evidence of irritation of the skin wherever it flowed over, leaving there reddish stripes. No angry wound could produce such acrid liquid and quick-made excoriations. The gentleman who aided in these trials repeated the effects by reversing the arrangement of the silver to the left shoulder. In four minutes, violent inflammation set in, with increased local redness, together with the excoriations of purple and red stripes produced down the back by the moisture that flowed from under the metal plates that were thus on the raw surfaces. When the experiment was ended, says Humboldt, notwithstanding all the care taken to gently wash away the flowing moisture as well as could be, still did his back appear as a whipped criminal. This very remarkable experiment, for testing the physiological action of that method of using galvanism was given by Baron Humboldt, the Nestor of natural science, early in the year 1790, and even before the discovery of the voltaic pile; but after the discovery of the electro-muscular contractions, by Galvani, through the twitchings of dead frogs from metallic contact."

AMERICAN WATCHES.—In our issue of June 16th we took occasion to urge upon the attention of our readers the importance of establishing, upon an enduring basis in this country, the manufacture of watches. That article attracted a good deal of attention; on another page of the present issue we publish the challenge and letter of Mr. Reed, of Roxbury, Mass., which seem to smack of the right spirit. Mr. Reed has made the study of watches his business for many years, and we do not hesitate to say, from a careful examination of the specimen he has shown us, that the watches made under his patent by E. Howard & Co., of Boston, are of the very highest of workmanship, fully equal to those of the same class which are imported from abroad. We hope, within ten years at least, to see the importation of watches effectually stopped by the establishment of the business in this country. We shall thus save over $2,000,000, which now go to England and Switzerland for what can just as well be produced at home

VULCANIZING INDIA-RUBBER AND GUTTA-PERCHA.—A patent has been issued to I. L. Pitman, of London, for the following peculiar vulcanizing process. Preparations of india-rubber or gutta-percha and sulphur are immersed in a bath of metallic alloy at its fusing point, and they are thus far more quickly vulcanized than by steam or oven heat, according to the common methods. An alloy of 50 parts bismuth, 31 of lead, and 19 of tin, will fuse at 203° Fah., and into this articles which are to be vulcanized at a low temperature may be plunged, in an open iron vessel. An alloy bath that fuses at 203° Fah., may be used to immerse the article in first, for the purpose of driving of the moisture, then they may be lifted and plunged into a second bath containing more lead, and the fusing temperature of which may be 250° at which heat it may be continued for about two hours, when the article will be *cured*. In the vulcanization of fine soft goods, it is preferred to raise the heat of the bath to 225° during the first hour, then raise it gradually up to 275° taking altogether five hours to do this. Coarse goods may be vulcanized in two hours, by raising the metallic bath up to the temperature of 300°. This is certainly a true vulcanizing process.

RECENT AMERICAN INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

ELECTRO-MAGNETIC PRINTING TELEGRAPH.

The principal advantage of this invention is based upon the fact, that the same type wheel is employed for receiving and transmitting messages. This purpose is effected by the arrangement of cogs on the under side of the type wheel in combination with a corresponding series of movable stops, operated by keys, and with one stop on the lever that carries the armature in such a manner, that the motion of the type wheel is arrested either by depressing one of the keys, or by passing a current through the electro-magnet. A rapid rotary motion is imparted to the type wheel by means of a clock movement, or in any other desirable manner, and the type wheel is stopped at the desired letters by means of a series of stops passing through and guided by a stationary ring, said stops being operated keys and by the brought in contact with one stop at the under side of the rotary type wheel. By this arrangement the type wheel is allowed to move from one letter to the other without interruption. The motion of the type wheel is governed by an escapement of peculiar construction, which enables the operators of two stations to adjust the motion of their type wheels so that they correspond with each other without fail. The credit of this invention

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belongs to E. F. Reynolds, of West Farms, N. Y., who obtained a patent for the same during the present week.

TEMPERING SAWS.

This invention relates to a new and improved means for tempering saws, that is to say, for lowering the temper from an extreme degree of hardness which is first given them, to a proper working temper. The object of the invention is to obtain a device which may be manipulated with facility, and at the same time so act upon the saw as to straighten them while reducing their temper. The invention consists in the employment of a stationary metallic bed placed over a suitable furnace, and used in connection with a suspended metallic pressure block, so operated as to have an oblique, or downward and forward pressure movement, whereby the desired end is obtained. The inventor of this improvement is William Clemson, of Middletown, N. Y.

FOLDING CHAIR.

The object of this invention is to obtain a chair which may be folded into a very small compass and still have a back capable of being inclined more or less at the option of the occupant. The invention is designed to facilitate and economize in the transportation of chairs, of the class alluded to, and to render the same more convenient and altogether more desirable in cases where they require to be frequently folded when not in use, for instance, when obtained for balconies, piazzas, &c., it being an object to have them fold as compactly as possible, so as to monopolize the least possible room. This invention was designed by James H. Swan, of this city.

BELT COUPLING.

This invention is an improved device for coupling together flat pulley belts, the object of the improvement is to make a self-coupling that may be applied to the belt, or detached from it in a very short time. It consists in the use of two rectangular frames suitably connected together at each end by jointed rods, and furnished with spikes and springs for preventing the ends of the belts from slipping from between the jaws of the frames when the belt is put under tension. This device has been patented to Charles Fairfax, Jr., of Cincinnati, Ohio.

CAR SPRING.

This invention has for its object the combining of india-rubber or other similar elastic substance with an air-chamber or bellows, either or both, in such a manner that the rubber or other elastic substance is used in connection with the atmospheric air so as to form a very efficient and durable spring for railroad cars, greatly enhancing the value of rubber springs which, heretofore, have had cheapness as their principal recommendation. This spring is the invention of G. L. Turner, of this city.

TANNING APPARATUS.

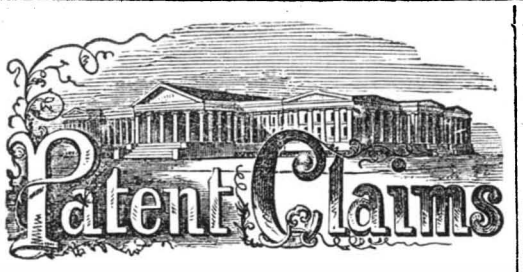
This invention consists principally in the employment of an air tank and air pump, with a suitable system of pipes and connections, in combination with the several tanks or vats employed in the process of tanning—such tanks or vats being made air-tight—which enables the liquors employed in the tanning process to be changed between the several tanks or vats, as far as necessary, by atmospheric pressure. It further consists in certain novel features in the details of the tanning process, whereby some important advantages are obtained. Dennis Aldrich, of St. Louis, Mo., is the inventor of this apparatus.

PROCESS OF DE-VULCANIZING IND -RUBBER.

This invention consists in subjecting the waste rubber to the combined action of a temperature of above 600° Fah., and steam without any considerable pressure, whereby the de-vulcanization is effected in a much shorter time, and more thoroughly than by any of the processes heretofore used. The patentee of this invention is A. C. Richard, of this city.

BURNISHING SPOONS.

This invention relates to a machine for burnishing the inner sides of the bowls of spoons, and consists in a novel means for graduating the pressure of the burnishers on the spoons, and also in a novel arrangement of parts for automatically feeding the burnishers over the work. The invention further consists in a means for presenting the burnishers to the work, and causing the same to act properly thereon. H. M. Jacobs, of Hartford, Conn., is the patentee, and his claims will be found on page 141 of our last number.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING AUGUST 21, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

29,655.—S. T. Adams and David Adams, of Medina, Ohio, for an Improved Washing-Machine:

We claim the arrangement of the fluted spiral rollers, d, yielding concave bottom, D, springs, D', M and L, box, A, uprights, C, rubber suspension arms, F F, shaft, G, crank, H, slide boxes, I I, the whole being constructed and arranged for operation, conjointly, as and for the purpose set forth.

29,656.—Dennis Aldrich, of St. Louis, Mo., for an Improvement in Construction of Tanning Apparatus:

I claim, first, The combination in the manner shown and described of air-tank, X, with air-pump attached, air-pipes, E E, tan liquor tanks, L L, lime tanks, O, and bate tanks, N, so that the liquid may be changed or moved by atmospheric pressure, to and from each and every tank thus combined, all as set forth.

Second, Providing the leeches with inclined bottoms, in connection with false bottoms, which have their central portions perforated, when the said inclined portions extend upward from the said perforated portions toward the walls of the vats, as and for the purposes set forth.

Third, The combination with the frames, G G, of rockers, e e, attached to rockshaft, d, for the purpose of imparting a reciprocating motion to the frames, G G, substantially as described.

Fourth, The construction of the reels, F, with radial slotted partitions forming several compartments, and with a hinged door to each compartment, substantially as and for the purpose specified.

Fifth, The employment in the pipes, 6, of three-way cocks, 2, when applied so as to open communication at either the upper or lower part of said pipes, as described.

29,657.—Daniel Argerbright, of Gratis, Ohio, for an Improved Combined Chuck and Counter-sink:

I claim the circular piece, B, in combination with clamps, b b b b, knives, d d, adjusting screws, i i i i, and guide pins, a a a a, when the whole shall be constructed and operated substantially as and for the purpose set forth.

29,658.—Daniel Arndt, of Zanesville, Ohio, for an Improvement in Beehives:

I claim, first, The employment or use of sand-paper or ground glass, B, applied to the exterior of a beehive around its entrance, or within a hive, at suitable places, for the purpose specified,

Second, The water-tank, or reservoir, C, provided with necessary eduction and induction pipes, e g, placed within a hive, A, substantially as and for the purpose set forth.

[This invention consists, first, in the employment or use of sand-paper and ground glass, or angular sharp sand placed around the entrance to beehives as well as within the corners of the same, and at other places where the bee moth usually deposits its eggs or passes over, in order to repel the moth from the hive, or prevent its entrance into it, the moth having a great aversion to such substances. The invention consists, secondly, in the employment of a water tank placed within the hive, and provided with an eduction pipe and rose, for the purpose of ejecting, when desired, the bees from the hive, and effect their removal to another.]

29,659.—J. B. Ash, of Elkton, Md., for an Improvement in Grubbing Machines:

I claim the combination and relative arrangement of hooks, A, slots, B, rollers, C, and hand levers, D, substantially as and for the purposes set forth.

29,660.—Edward Backus, of Rochester, N. Y., for an Improved Propeller for Canal Boats:

I claim the arrangement of the engines, D, frame C, wheel, D, and windlass, E, the whole constructed and operated substantially as and for the purposes specified.

29,661.—C. L. Barritt, of New York City, for an Improvement in Scythe-fasteners:

I claim the plate, b, as described, for adjusting and holding the shank of a scythe, by means of adjustable wood or other wedges, in combination with the cap plate, h, and ring and wedge, j and k, or their equivalents, when used for the purposes set forth.

29,662.—J. H. Beadle, of New York City, for an Improvement in the Construction of Breast Pumps:

I claim a breast-pump, having in combination the reciprocating barrel, D, tube, C, packing, c, and valves, b and e, constructed and operating substantially as and for the purpose specified.

[This invention consists in combining the pump barrel of a breast-pump with the glass tube leading from the cup in such a manner that said tube forms the piston-rod, and that by imparting a reciprocating motion to the barrel, the operation of pumping is effected.]

23,663.—Wm. Blake, of Boston, Mass., for an Improvement in Cleansing Galvanized Iron Pipes:

I claim my new process, substantially as specified, for effecting the removal of the surplus zinc from a galvanized or zinc-coated screw, the essential element of such process being the heating of the tube, or rod, and the putting it in revolution by means substantially as described, against a brush, or equivalent, for producing friction.

29,664.—Wm. Blake, of Boston, Mass., for an Improvement in Cleansing and Separating Galvanized Nails:

I claim my mode or process, substantially as described, of treating galvanized or zinc-coated nails, on their removal in mass from the coating bath or furnace, such process involving the use of gravitation (or a tube) on inclined plane, or slab, and a water bath, in manner as specified.

And I also claim the combination and arrangement of the tube, the inclined plane and the water bath, for the purpose specified.

22,665.—Ludwig Brumlen, of Hoboken, N. J., for an Improvement in the Mode of Making Oxychloride of Lead:

I claim the process, as set forth, in the description, of manufacturing oxychloride of lead from chloride of lead and subacetate of lead leaving in solution neutral acetate of lead free to be used over and over for the same purpose.

29,666.—R. D. Bryce, of East Birmingham, Pa., for an Improved Attachment of Covers to Glass Vessels:

I claim attaching metallic covers to mugs, pitchers, or other vessels of glass or earthenware, by hinging the upper hinge piece of the cover immediately to the handle of the vessel, or to a knob or projection one or near its rim, thus dispensing with a lower hinge piece of metal, substantially in the manner and for the purpose set forth.

29,667.—A. M. Burnham, of Montpelier, Vt., for an Improvement in Machines for Sawing Stone:

I claim the arrangement of the bar, g, arms, f, rock bars, b b', bent lever, E, the frame, C, and with the saws, D, and frame, B, the whole constructed and operating as shown and described, for the purpose set forth.

[This invention consists in the peculiar means employed for giving the saws a lateral vibrating movement while working in the usual reciprocating manner to produce the cuts, the lateral movement of the saws admitting of their oblique position relatively with each other, and enabling them to cut simultaneously the two opposite sides of a polygonal taper block.]

29,668.—J. Carl and J. W. Heath, of Grenada, Miss., for an Improvement in Casting Screw Augers:

We claim the combination of the shaft pattern, A, and the segmental spirals, H', constructed, arranged and applied in the manner set forth, for the formation of molds for casting spiral augers.

29,669.—D. P. Chamberlin, of Hudson, Mich., for an Improvement in Instruments for Pruning Trees:

I claim the combination of the oblique-cutting blade, with the cutting hook, the parts being arranged and operated substantially as and for the purpose set forth.

29,670.—Wm. Clemson, of Middletown, N. Y., for an Improved Saw-set:

I claim, first, The combination of the cam, E, and spring or trip hammer, H, with a suitable anvil, I, arranged for joint operation, substantially as and for the purpose set forth.

Second, Having the cam, E, slotted radially and provided with a bar, c, and screw, d, substantially as shown, for the purpose of rendering the cam adjustable, to move the saw a greater or less distance, according to the size of its teeth.

Third, The arrangement of the gage, K, formed of the lips, f f, at the end of the plate, L, and the slide, M, in connection with the cam, E, hammer, H, and anvil, I, for the purpose specified.

[This invention relates to a device for setting saws by power, the parts working automatically by the rotation of the driving shaft. The invention consists in the employment of a spring hammer, cam, anvil and gage, so constructed and arranged to operate that the desired work may be rapidly and properly done, and the device rendered capable of setting saws with different sized teeth.]

29,671.—Wm. Clemson, of Middletown, N. Y., for an Improvement in Tempering Saws:

I claim the fixed metal bed, A, placed over a suitable furnace, in connection with a suspended pressure metal block, D, operated by the inclined plane, G, and eccentric, I, or other suitable means to to give the block an oblique downward movement towards the bed, as and for the purpose set forth.

29,672.—Ephraim Cushman and J. R. Cushman, of Amherst, Mass., for an Improvement in the Manufacture of Leather Paper Stock:

We claim heating the stock while it is in the beating engine, and removing the impurities as they rise, as set forth, for the purpose specified.

29,673.—George Danforth, of Friendsville, Ill., for an Improvement in Corn-shellers:

I claim the arrangement together of the short and long springs, I, in the manner shown for the purpose specified.

[This invention consists in the employment or use of a series of springs placed in conical form, and so arranged that the ears of corn may be forced down between them and have the grain stripped from the cob thereby; the ears being forced down between the springs by means of a lever and a pin attached to a traverse bar fitted between suitable guides.]

29,674.—L. B. Darling, of Providence, R. I., for an Improvement in the Construction of Stone Tanks:

I claim a tank or vessel the bottom and sides of which each consist of one or more pieces or slabs of stone arranged and combined in the manner shown and described, with the plates, c, horizontal rods, d, plates, B B', perpendicular rods, C, and rubber packing, a —all as set forth for the purpose specified.

[This invention consists in constructing tanks of any desired capacity of slabs of stone, such as serpentine, granite, or any other suitable stone or even glass, if convenient, which are brought together and clamped with metal rods and plates, with rubber introduced at the joints to form the packing.]

29,675.—Jacob David, of New York City, for an Improvement in Combined Shutters and Awnings for Windows:

I claim hanging blinds or shutters by a pivoted or swivel hinge at the top, using the ordinary hidge at the bottom, and applying hooks, g g, or their equivalents to the shutters inside and a suitable locking bolt to them, so that the shutters will serve either as such or as an awning in the manner substantially as described.

I also claim, in combination with the above, the side canvas as described.

[This invention consists in hanging window blinds or shutters by double swivel hinges at the top, and by ordinary hinges at the bottom, so that they will serve as shutters and, by a simple manipulation, a very good awning may be made for the rain and sun.]

29,676.—Armenius Davis, of Shelbyville, Ind., for an Improvement in Cane Guns:

I claim the arrangement and combination of straight, percussion bar, F, and trigger bar, D, when these are made with their various peculiarities as shown, and operated as described.

29,677.—James Dakin, of Cleveland, Ohio, for an Improved Mode of Elevating and Delivering Water from Wells:

I claim the inclined board, K, performing the several functions described, in combination with the spouts, A' and E', bucket, E, valve, M, rod, I, rope, S, and counter-balance weight, F—the whole being constructed, arranged and operated in the manner and for the purpose set forth.

29,678.—Wm. Deckmann, of Canton, Ohio, for an Improved Bedstead:

I claim the castings, A and B, as described, in combination with slides, D, and parts operating the same, as applied to bedstead fastenings.

29,679.—J. N. Dennett, of Bath, Maine, for an Improved Bed-bottom Slat:

I claim the combination and arrangement of the blocks, a b, the slat, c, the blocks, d e, and the strips, g h, substantially as and for the purpose specified.

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29,680.—Henry Disston, of Philadelphia, Pa., for an Improved Machine for Grinding Saw Blades:

I claim, first, Grinding saw blades by placing them on concave or curved plates and causing the plates to traverse in such a direction, in respect to a revolving grindstone, that the latter shall bend the blades into the concavity of the plates during or prior to the operation of grinding, for the purpose specified.

Second, Combining an endless chain of concave plates, G, with a revolving grindstone substantially in the manner set forth, so that a continuous succession of blades may be submitted to the action of the stone, as specified.

Third, The combination with the endless chain of plates, G, the adjustable guides, M M′, or their equivalents—the whole being arranged and operating substantially as and for the purpose herein set forth.

Fourth, Causing the plates, G, as they pass beneath the grindstone to be tilted by means of an inclination in one of the guides, or any equivalent device.

29,681.—Aaron Douglass, of Paterson, N. J., for an Improved Lock Joint for Railway Bars:

I claim the process shown and described of making the lock joint, in Patent No. 14,868, as set forth.

[This invention consists in the employment of dies of a novel construction by the use of which, after the end of a rail is heated to a "welding point," the ends may be swaged into the desired shape, with the proper laps and shoulders; besides a swelled neck is produced at the ends, which adds materially to the strength of the joint when made.]

29,682.—E. G. Dyer, of Hamilton, Ohio, for an Improved Feed Motion for Sawmills:

I claim the arrangement of the sheaves or pulleys, F, reversing sheaves or pulleys, H and I, disk, J, and reversing lever, f, link, e, and bars, b b′, or their equivalents, whereby motion is communicated to the feed gear of a log carriage in either direction substantially in the manner described.

29,683.—J. W. Evans, of New York City, for an Improvement in Fastenings for Cotton Bales:

I claim the application and use of the metal piece, A, bent in the shape of the letter S, and operating on the hoop in the manner and for the purpose substantially as described.

29,684.—Charles Fairfax, Jr., of Cincinnati, Ohio, for an Improvement in Couplings for Belts:

I claim the belt coupling described, consisting of two frames, A A, jointed together by rods, a a, and furnished with pins, b b, substantially as described.

29,685.—George Farmer, of Osceola, Fla., for an Improvement in Harvesters:

I claim the arrangement, as shown and described, of the rack bar, P, driving wheel, Q, rake head, J, shaft, R, pinion, S, and section cog wheels, m n, so that the section wheels will rotate the shaft, R, first in one direction and then in the opposite, thus causing the rack bar, P, to reciprocate and carry the rake, and also cause the latter to open and close—all as set forth.

Also, the making of the cutters with their rear ends bent up to fit the back part or edge of the cutter bar, and with their sides beveled and notched as shown, when fastened by the hooked bolts or nuts, d, in the manner shown and described; one edge of each cutter being held up by a hook and the opposite end being held up by the overlapping bevel of the edge of the adjoining cutter—all arranged as set forth.

[This invention relates to a novel and improved manner of attaching the sickle teeth to their bar, whereby the teeth may be readily detached from the bar and secured to it, thereby admitting of the sickle being easily kept in proper working order, as broken teeth may be easily replaced by new ones, and those dulled by use detached, ground and replaced without difficulty. The invention also relates to an improved raking attachment applied to the machine and operated in such a way as to form a simple and efficient mechanism for the intended purpose. The invention further relates to a novel arrangement of the platform and main frame of the machine, whereby the usual grain wheel and shoe are dispensed with and the position of the parts rendered favorable for the application of the raking attachment as well as for the means employed for regulating the hight of the sickle.]

29,686.—David Flannery, of Jackson, Miss., for an Improvement in Telegraphic Instruments:

I claim the arrangement of an electro-magnet and armature, a clock movement and escapement, and a resonance box, substantially as described.

[This invention consists in an electro-magnet and armature, a clock movement and escapement, and a resonance box—the whole combined to constitute a simple and cheap instrument for the production of sounds alone or sounds and marks at long or short distances without the aid of a local battery.]

29,687.—Wm. F. George, of Cincinnati, Ohio, for an Improvement in Stoves:

I claim, first, In combination with the outer casing, A, the oven, H, of the herein-described peculiar shape and form, the same being made to present a gradually-increasing sectional area in the manner and for the purpose set forth.

Second, Gradually diminishing the area of the annular flue, J, between the outer casing, A, and the oven, H, in proportion as the sectional area of the latter is made to increase in the manner as and for the purpose set forth.

29,688.—Christian Germann, of Camden, Mich., for an Improved Reciprocating Saw:

I claim varying the teeth of saw teeth as they approach the middle of the blade, and also diminishing their distance apart as they approach the middle of the blade, as and for the purposes set forth.

[This invention consists in varying the pitch of the teeth in the same blade and in gradually diminishing their obtuseness as they approach the middle of the saw blade.]

29,689.—T. M. Green, of Milledgeville, Ga., for an Improvement in Seed Planters:

I claim the arrangement of the sliding bars, C C, and serrated strips, G G, stirrers, I I, fastened to the sliding bars, connecting rods, D D, and driving-shaft cranks, F F, substantially as and for the purposes set forth.

29,690.—Origin Hall and Timothy Merrick, of West Willington, Conn., for an Improvement in Machines for Dressing and Finishing Thread:

We claim, first, The employment of grooves, e, upon the hot polishing cylinder, I, so that an increased extent of thread surface will be exposed to the heat of the cylinder, as set forth.

Second, The combination of the four adjustable grooved conducting rollers, C C1 C2 C3, with the brush cylinder, B, as and for the purpose shown and described.

Third, The combination of the adjustable rack-toothed slides, R R, pinions, T, roller, Q, standards, S, and cylinder, I, as and for the purpose shown and described.

[This invention consists in certain provision for adjusting the conducting rollers claimed by the same parties two weeks previously; it also consists in an improvement in the calendering cylinder by which the thread is finished after the action of the brushes.]

29,691.—Leonard Harriman, of Anderson, Ind., for an Improvement in Seed Planters:

I claim, first, The construction and arrangement of the teeth, E, when combined with a rotary seed planter as and for the purposes set forth.

Second, The combination of the carriage, A, levers I, rod, J, catch, K, and wheels, H, in the manner and for the purposes set forth.

Third, The arrangement of the slides, D, springs, G, and segmental cam, F, constructed and operating in the manner and for the purposes set forth.

29,692.—J. M. Hathaway, of New York City, for an Improvement in Handle Fastenings for Augers:

I claim the application of the slotted or notched key in combination with the correspondingly-notched auger or bit tang, both tang and key being provided with metal bearings by means of the metal ferule or its equivalent—the whole being constructed and operating substantially as described, for the purpose stated.

23,693.—Alexander Hay, of Philadelphia, Pa., for an Improvement in the Construction of Railroads:

I claim a railroad chair constructed substantially as described, for the purpose of holding the rails in place and, at the same time, supporting a railroad track, and so formed as to be screwed or driven into the foundation substantially as set forth.

I also claim the groove in the chair in combination with the groove in the rail, for the purpose of wedging the rail in place, when constructed substantially as described.

29,694.—D. K. Hickok, of Morrisville, Vt., for an Improved Clothes-drier:

I claim the arrangement of the grooved, headed standa d, A, closed cap hub, B, pins, h h′, and cord, C, combined with arms, D, braces, E, and lower hub, c, as and for the purpose set forth.

29,695.—Thomas Hopkins, of Newport, Ky., for an Improved Sack-fastener:

I claim a sack-fastener consisting of two pins or buttons, A and A′, and a connecting link, B, constructed and combined in the manner and for the purposes set forth.

29,696.—H. A. House, of Brooklyn, N. Y., for an Improved Gate:

I claim, first, The arrangement and combination of the toggle arms, D D′, hand levers, E E′, pendulum levers, B B′, and gates, A A′, constructed and operating substantially in the manner and for the purposes set forth.

Second, The combination with the toggles, D D′, and hand levers, E E′, of the weighted hinged dogs, F F′, arranged substantially as and for the purpose specified.

[This invention consists in arranging a knee or toggle-joint and two pendulum levers in combination with two hand levers in such relation to the gate or gates, which are suspended from said pendulum levers, that by depressing either one or the other of said hand levers the pendulum levers are forced apart by the action of the toggle-joint and the gates are opened and kept open until the toggle joint is brought within a horizontal line drawn through its center. The invention also consists in combining with said toggle-joint and hand levers two hinged, weighted dogs, which retain the gates when closed and which are released by the levers before they act on the toggle joint, thus allowing the gates to open without obstruction when the levers are pulled, but preventing them from opening spontaneously or by the force of the wind or from any other cause.]

29,697.—R. B. Hugunin, of Cleveland, Ohio, and G. W. Whitney, of Berea Ohio, for an Improved Washing Machine:

We claim the arrangement of the grooves or corrugations of the surfaces, C D, to run in contrary directions as and for the purposes shown and described.

We also claim the arrangement and combination of the adjustable pressing lever, K, with the shaft, B, yoke, E′, uprights, E, disk, D, and bottom, C, as and for the purposes shown and described.

[This invention consists in applying to a tub, with a fluted metalic plate in its bottom, a circular disk having its underside covered with fluted sheet metal; and in arranging this upper or rubbing disk in such a manner with relation to a central upright shaft and a coiled spring that the disk will be held down with a yielding power upon the clothes placed under it, and thereby adjust itself to the inequalities of clothing and also accommodate itself to garments of any ordinary size to be washed. It further consists in combining with said rubbing disk a yoke of a suitable character, for steadying the disk, to which is attached a rod, connecting with a bell-crank, for giving, by a rotary motion of the crank, an alternate, circular motion to the disk. With the disk and yoke is also combined a lever screw for compressing the clothes while in the tub, with sufficient power to squeeze the water out of them and render them comparatively dry. The machine combines simplicity of construction with great efficiency in its operation upon the work.]

29,698.—J. H. Irwin, of Beardstown, Ill., for an Improvement in Harvesters:

I claim the fingers, J, in combination with the sickles, K K′, and the mechanism for operating them, arranged in the manner described, for the purpose set forth.

[This invention relates to an improvement in the cutting devices of harvesters, whereby, it is believed, the sickle is made to work with a more even or regular movement than the ordinary reciprocating ones, with less wear and tear of the parts connected with it, and also to cut with a less expenditure of power without being so liable to choke or clog.]

29,699.—Adolph Isaacsen, of New York City, for an Improvement in the Construction of Apparatuses for Destroying Insects:

I claim the new article of manufacture described, composed of the rubber bag or ball, A, the nozzle, B C, and strainer, b, arranged to operate together in the manner set forth.

29,700.—F. C. Kutt, of Hackensack, N. J., for an Improvement in Stopping and Starting Railroad Cars:

I claim, first, The arrangement of inclined planes, b b, on a car body, in combination with friction rollers, D, or their equivalents, constructed and operating substantially as and for the purpose specified.

Second, The combination with the car body, E, upon inclined planes, b b, and rollers, D, of a chain brake, G, constructed and operating substantially as and for the purpose set forth.

[The object of this invention is to take advantage of the momentum acquired by a car while in motion and apply it to the stopping and starting of the car, so that if the car is alternately started and stopped, the momentum acquired in stopping the car assists the animals drawing the car in starting it from a dead stand.]

29,701.—S. K. Landes, of West Cocalico, Pa., for an Improvement in Machines for Dressing Millstones:

I claim the combination of the movable frame carrying the band wheels, springs and cutters; the whole being arranged so as to move from right to left, or the reverse, by the shifting mechanism, substantially as described.

29,702.—Bernard Lauth, of Pittsburgh, Pa., for an Improvement in Rolling Iron Bars, &c.:

I claim holding plates, rods or bars of iron and steel under tension, longitudinally, by mechanical means, whilst they are being reduced or compressed between rollers, substantially as described.

29,703.—Lorenzo Lea, of Jackson, Tenn., for an Improvement in Surveyors' Leveling Instruments:

I claim connecting the bubble block and telescope of a leveling instrument with the tripod or supporting staff, by means of a curved spring, in combination with a single set screw, for the purpose of adjusting the position of the level in relation to the supporting staff or tripod, substantially in the manner described.

29,704.—Lewis Leber, of Springfield, Ill., for an Improvement in Cultivators:

I claim, first, The arrangement of the plows, K L, and the cultivator frame, substantially as and for the purposes set forth.

Second, The combination with a cultivator, of the swingle-tree, U, the crossbar, W, at the top of an elevated draught pole, two vertical levers, V V, and an arched yoke, Y, substantially as and for the purposes set forth.

29,705.—J. R. Marshall, of Marine, Ill., for an Improvement in Corn-stalk-cutters:

I claim the use of the three rollers, A A A (with knives set longitudinally on their peripheries), in combination with each other; and this I claim, not as a combination, except when the said rollers are arranged in separate frames, and the said frames are united in relation to each other in the manner shown, and by means of flexible joints, so that the said rollers can follow the uneven surface of the ground, and thus cut the stalks and litter that lie in the hollows and holes thereof.

29,706.—Wm. McAfee, of Summerville, Mich., for an Improved Gate:

I claim the combination with the central swinging and vertically moving post, A, in the manner shown and described, of the lifting levers, H H, rods, l l, cylinder, E, inclined edged cylinde within E, and pin, G, for the purpose set forth.

[This invention consists in having the gate fitted centrally on curved inclined planes, and arranged with a central post or shaft, traversed pin, levers and rods, whereby the gate is opened by a combined vertical and rotating movement, and a very substantial gate obtained by the arrangement, and one that cannot casually open.]

29,707.—T. W. McDill, of Oquawka, Ill. for an Improvement in Cultivators:

I claim the arrangement of the axle, A, and bars, b b k k, and crosspiece, c, with the loose connnection of the draught pole, B′, to the machine, substantially as and for the purposes set forth.

[The object of this invention is to obtain a cultivator which may be readily manipulated, or which may be attended and guided with but little labor. This result is obtained in consequence of provision being made for controlling the implement with facility by giving some of its plows an independent adjusting movement independently of the draft movement, whereby the implement may be kept in its proper course and obstructions readily passed over; the implement, also, by a very simple adjustment, admitting of being readily drawn from place to place.]

29,708.—G. C. Miller and Richard Henry, of Cincinnati, Ohio, for an Improvement in Hillside Plows:

We claim, first, The described combination of the reversible share and moldboard, E, when formed entire of steel or wrought iron, and the separate cast swivel, F, the said parts being constructed, arranged and connected in the manner and for the purposes set forth

Second, The combination of the segmental bracket, H, slot, i, clamp screw, G, and moldboard, E, when constructed, arranged and operating in the manner and for the purposes set forth.

29,709.—J. A. Naylor, of Rahway, N. J., for an Improvement in the Extension of Seats for Carriages:

I claim the arrangement of the removable seat, B, supplemental seat, C, and hinged braces, D, operating together in the manner and so as to produce the effect set forth.

27,719.—Lewis Newsom, of Gallipolis, Ohio, for an Improved Device for Heating Rooms:

I claim the arrangement of the radiator, constructed as specified in the particular manner described, in relation to the fire-place and chimney.

29,711.—E. G. Niles, of Cincinnati, Ohio, for an Improved Cooking Range:

I claim the arrangement of the small supplementary oven, F, flues, H, and damper, I, in the described connection with and relation to the detachable supplementary furnace, K, and flues, G, of the main furnace, B, and oven, E; the said parts being constructed and combined and operating in the manner and for the purposes set forth.

29,712.—H. W. Norvill, of Livingston, Ala., for an Improvement in Car Brakes:

I claim the employment of the levers, H, the bars, B, lock bars, M, and buffer rods, I, arranged to operate substantially as and for purpose set forth.

[This invention relates to an improvement in that class of car brakes in which the power is applied through the momentum of the cars, as the speed of the latter is checked by the engineer. The object of the invention is to obtain a simple and efficient arrangement which will place the brakes under the complete control of the engineer, and by which the cars, in cases of emergency, may be suddenly stopped.]

29,713.—D. P. Patterson, of Fayette county, Pa., for an Improvement in the Construction of Distillers' Mash Tubs:

I claim the combination, with the stirring rake of a mash tub, of the perforated steam arms, A A′, constructed, arranged and operating substantially in the manner described.

29,714.—N. A. Patterson and W. L. Ramsey, of Kingston, Tenn., for an Improved Washing Machine:

We claim the circular perforated and dish-shaped pressure plate, E, placed within a tub, A, and having the upper end of its shaft, j, fitted in a crank, f, of a shaft, D, all being arranged as and for the purpose set forth.

[An engraving and description of this invention will be found on page 160].

29,715.—S. J. Perry, of Columbia, S. C., for an Improvement in Drawing Boiler Tubes:

I claim the instrument composed principally of a screw, B, and attached cone or circular wedge, A, a set of connected clamps, G G, and a swivel, D E F, the whole combined and operating substantially as specified.

[The character of this very useful instrument can be understood by the claim.]

29,716,—David Ralston, of Carlisle, Pa., for an Improvement in Rock Drills:

I claim the arrangement of the adjustable frame, B, the spring, C, the drill, D, the cross-head, E, and guides, F, with the connecting rod, a, the bell-crank, b, the ratchet, c, and the ratchet wheel, d; the several parts being constructed and connected substantially as and for the purpose specified.

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29,717.—A. C. Richard, of New York City, for an Improvement in Devulcanizing Waste Rubber:

I claim the described process by which waste vulcanized rubber is devulcanized, all as set forth.

29,718.—J. H. Reighard and C. L. Knecht, of Birmingham, Pa., for an Improved Attachment for Hinged Covers for Glass Vessels:

We claim attaching caps or covers to mugs or other articles of glassware, by means of a hole pressed through the glass handle of the vessel, through which is passed a metallic pin, attached to or forming part of the hinge of the cover, constructed and secured in the manner described.

29,719.—A. Roden, of Talladega, Ala., for an Improvement in Presses:

I claim the arrangement of two levers, K. N, and toggle-joints, G H, in combination with the follower of a press, substantially as and for the purposes set forth.

29,720.—J. B. Sargent, of New Britain, Conn., for an Improved Picture Nail Head:

I claim a head or knob made in three parts, substantially as described.

29,721.—J. P. Schenkl, of Boston, Mass., for an Improvement in Umbrellas:

I claim not only applying the slider or runner to the joint ring of the rib struts in such manner as to enable such slider to carry such joint ring and be turned or revolved therein and on the stick, but in constructing such slider and the stick with the bayonet studs and catches, or equivalent latching devices, applied to them, substantially in manner and to operate as described.

And in combination with the joint ring and the slider applied to it, and furnished with bayonet catches, as described, I claim constructing both bayonet catches with inclines or cams, and applying a retractive spring to the joint ring and the slider, so as to turn such slider in a direction contrary to that in which it may be moved by either cam, in order to effect the latching of a bayonet catch on its stud at either the opening or the closing of the umbrella.

I also claim the application of the rib cap and its retractive spring directly to the slider or the slider and its catches, so as to enable the rib cap to be moved with the slider, and operated relatively to the outer ends of the ribs or the ferrules thereon, essentially as above explained.

29,722.—George Scrimshaw, of Milesburg, Pa., for an Improved Composition for Pavements, &c.:

I claim the mixing of broken stone or cinder, coal ashes, gravel and coal tar, in the proportions substantially as mentioned, for the purpose of forming a composition for pavement, as described and set forth.

29,723.—Wm. Shearer, of Atlanta, Ga., for an Improvement in Pumps:

I claim, first, The combination of the screw piston rod, H, openings, O, with journal, J, and nut plates, b b, substantially as set forth.

Second, I claim the combination of the screw piston rod, H, with its pisten heads, i i, packings, j j, and plates, k k l l, with chambers, B B', and water passages, d e, arranged to operate in relation to each other, as and for the purposes set forth.

27,724.—J. S. Smith, of New York City, for an Improvement in Military Caps:

I claim, first, The arrangement of the annular channel, a, in combination with the tip, B, of a cap or hat, constructed and operating substantially as and for the purpose set forth.

Second, The combination with the annular channel, a, of a perforated false bottom, D, substantially as and for the purpose specified.

Third, The arrangement of the annual flange or lip, h, in combination with the ordinary ventilator, C, constructed and operating substantially as and for the purpose described.

[This invention consists in arranging in the upper part of a cap or hat an annular channel, with inclined sides, which communicates with the interior of the cap or hat and with the external atmosphere, through a series of apertures, in such a manner that the foul air from the interior of the cap or hat is allowed to pass freely out into the external air without allowing any water or rain to enter; also in combining with said annular channel a false bottom with a series of perforations, in such a manner that an air chamber is formed on the top of the cap or hat, and that the force of the sun's rays, as the same strikes the crown of the hat or cap, is broken before the same can have any injurious influence on the head of the wearer; also in arranging the usual circular perforated ventilators with an annular lip or flange under the ventilating holes in such a manner that the water, which may enter through these holes, is shut off from the interior of the cap or hat and caused to pass out through the holes on the opposite sides.]

29,725.—Walter Somerville, Jr., of Mitchell Station, Va., for an Improved Railroad Car Brake:

I claim, first, The arrangement for compressing air upon cars in combination with the brakes, for the purpose of operating them, whether applied to one car or to a train of cars, substantially as described.

Second, I also claim the arrangement of the cover, Z2, for the purpose of excluding dust and cinder and of admitting pure air into said pump, in combination with the tub, Z', substantially as described.

29,726.—P. H. Starke, of Richmond, Va., for an Improvement in Plows:

I claim the construction and relative arrangement of the wing, c e, and moldboard, a g i j k (fastened together by means of bolt, n, and hooks, f f, and slots, h h), the plow standard, b t s r, the point, d g i k l m, and the landside, e r l m, all as shown and described.

29,727.—H. D. Stover, of New York City, for an Improved Shaping and Molding Machine:

I claim, first, So constructing and arranging the several parts of my machine, that the same arbor and cutter-head may be used vertically or horizontally, or any intermediate angle, and be moved to any such position with great celerity, and firmly secured therein to shape the various moldings or substances with the same head and cutters, essentially in the manner as described.

Second, Combining the laterally adjustable pressure rolls with the feed rolls and cutter-head, so that the axes of the former shall lie between planes perpendicular to the bed of the carriage and passing through the axes of feed rolls and cutter-head, substantially as and for the purpose set forth.

Third, The vertically moving carriage, U, with its slides, C', in combination with the slotted plate, F', arms, G', and cams, F'', upon feed roll shaft, arranged and operating substantially as specified.

Fourth, Forming the recesses of the cutters in a cylindrical cutter head, with their beds obliquely or angularly inclined to the axis of the shaft.

Fifth, The longitudinally adjustable guides, R', upon the table, C, when combined with the described cutter-head, operating as and for the purpose set forth.

29,728.—H. D. Stover, of New York City, for an Improved Planing Machine:

I claim constructing and applying an adjustable elastic or flexible wiper, K, and L, to effectually clean or wipe the finished board or surface of material being planed after leaving the cutting blades and before reaching the back rigid pressure roll, J, for holding down the board and not mar its surface, substantially in the manner and for the purposes set forth.

I also claim the combination of wiper, K and L, the ont yielding pressure roll, I, the cutting cylinder, F, and the back adjustable but rigid pressure roll, J, for firmly holding down the board front and back of cutter and beautifully finishing the surface, essentially in the manner and for the purposes set forth.

29,729.—J. H. Tatum, of New York City, for an Improvement in Candle-wicks:

I claim the plaited wick for candles, composed of five strands, so arranged that the strands on either side of the wick run from both edges toward the center in an upward direction, or from the center toward both edges in an upward direction, as described.

[The structure of this wick is explained by the claim. The object of the invention is to obtain the necessary degree of capillarity, and at the same time to make the wick stand up stiff enough and make it turn out of the flame in order to be consumed.]

29,730.—W. W. Taylor, of South Dartmouth, Mass., for an Improved Tree Protector:

I claim making the tree-protecting trough in two parts, prepared and put together substantially as set forth in the specification.

I also claim the use of the cloth screen, or its equivalent, for the purpose of guiding the insects climbing over the trough, in place of the packing now used as a receptacle for salt, or its equivalent, all in the manner and for the purposes set forth.

I also claim arranging the dome of a tree protector, so as to throw the drip towards the tree and between the trough and the tree, substantially as set forth.

29,731.—T. S. Truss, of Darlington, England, for an Improvement in the Construction and Joining of Pipes:

I claim the making of an expansive or contractile joint by which pipes (for the transmission of gas, water, steam or other fluid) are to be secured together by means of a compressing or nut-coupling strap, in two or more parts, with packing material upon, between or around the ends of the pipes embraced by the strap.

I also claim as my invention the making of the junctures of coupling straps with recesses and corresponding projections or loose blocks.

I also claim as my invention the making of pipes with flanges at or adjoining their ends, to be used with or operated upon by a compressing or nut-coupling strap, with packing material upon, between or around the same and embraced by the strap. I wish it, however, to be distinctly understood that I do not claim pipes with flanges at their ends, secured together by bolts, pins or colters passing through the same.

29,732.—G. L. Turner, of New York City, for an Improvement in Railroad Car Springs:

I claim, first, The employment or use of india-rubber, or other similar elastic material, in connection with air-chambers between said rubber and suitable metal plates, when said air-chambers communicate directly with the external air, either by means of perforations, p, or by valves, t, or when said chambers are provided with bearing plates, D, to prevent the eventual filling and permanent occupation of the air-chambers by the rubber under compression, substantially as and for the purpose set forth.

I also claim the construction of the plates with protuberances, l, or concaves, d j, u on them and distributed over the faces of the plates at intervals, substantially as shown, for the purpose of graduating the strength or resistance of the springs, when they are compressed as set forth.

29,733.—James Van Valkinburgh, of Binghampton, N. Y., for an Improved Machine for Cleaning Rice:

I claim, first, The employment of the device, E, when constructed with spiral flanches, f, which are set tangentially on a hub, g, which is provided with steep inclines; all in the manner and for the purpose set forth.

Second, The deflecting step, h, when made conical or concave round its circumference and without spiral projections or ledges, in combination with a screw, E, as and for the purposes described.

[This invention relates to certain improvements in that class of rice-cleaning machines in which a rotary screw is employed within an ellipsoidal mortar, and arranged in such a way that the rice, by the rotation of the screw, will be subjected to an action within the mortar, favorable to the removal of the pellicle or inner coating which encompasses the kernels or grains, and which is not removed during the hulling operation.]

29,734.—C. L. Waffle, of Sharon, Ohio, for an Improvement in Corn Planters:

I claim the disk, S, pin, T, and notches, a e i, when these are arranged substantially as described, in relation to other parts, for depositing and covering the grain, immediately beneath the periphery of the main wheel, or for scattering the grain before or behind its track, as specified.

29,735.—Miller Warren, of West Middleburg, Ohio, for an Improvement in Seed Planters:

I claim the arrangement of the levers, K K', rods, V V, rake, U, delivering slide, H, and seed-box, M; the whole being constructed to operate as described, for the purposes set forth.

29,736.—P. B. Wever, of Scarborough, Ga., for an Improved Cotton Press:

I claim the combination with the hinged parts, k, of the springs, n, rods, o, pulleys, p, and ropes, q, as and for the purpose shown and described.

[This invention relates to certain improvements in that class of presses in which a right-and-left screw is used, in connection with toggles, for applying the pressure to the substance to be pressed. The object of the invention is to expedite the pressing operation, and also to facilitate the placing of the loose cotton within the press-box, as well as its removal therefrom in bale-form.]

29,737.—L. B. White, of Moscow, N. Y., for an Improvement in the Construction of Hernial Trusses:

I claim the connection or combination of the spring, S, by means of the hook, immediately with the lever of the truss, herein described.

29,738.—Luther Whitman, of Winthrop, Maine, and Ezra Whitman, of Baltimore, Md., for an Improvement in Casting Cylinders for Threshing Machines:

We claim the method described of casting threshing-machine cylinders in a single piece, and having rectangular tapering holes in them for the reception of the threshing teeth, as set forth.

29,739.—J. D. Willoughby, of Petersburg, Va., for an Improvement in Machines for Forming Grooves in the Necks of Cans, &c.:

I claim the combination of the mouth-piece, A, the springs, B and C, and the pins, a a, when the same are so arranged as to form grooves in the necks of cans, jars and bottles, when the material is plastic, substantially as specified.

29,740.—G. J. Wilson and D. H. Fox, of Reading, Pa., for an Improvement in Gas Meters:

We claim, first, The application of tube, V, of any convenient length, size, shape or form, and located at any convenient place in or on the meter, with one end open inside of the meter at or about the working water-level of a wet gas meter, with the other or outer end opened or closed by a screw or otherwise, at or about the water-level of the water.

Second, The application and combination with tube, V, and the other general arrangement of a wet gas meter, of a filling tube, W, of any convenient size, shape or form, with the lower end passing below the water-level of the meter, and the upper end passing high enough to overcome the pressure of gas in the meter, to prevent an overflow of water, with an open filing tube, also, to admit of water being filled into the meter without turning-off the gas.

29,741.—Bancroft Woodcock, of Williamsburg, Pa., for an Improvement in Plows:

I claim, first, The cutter, C, as set forth, in combination with the corresponding fitting part in the face-side of the landside, L, and the upper part of the landside made sharp, that when it and the cutter are united, they form one continuous cutter, as substantially described, when said parts are combined with the moldboard, M.

Second, The arrangement of the movable point, P, with its sections, as set forth, and the share, S, with its upper and lower sections, as stated, and the knob, p, on the lower edge of the landside, L, for the purpose named, in combination with the point and share, as specified above.

Third, In combination with the above, I also claim the arrangement of the clevis, D and circular saw, A; the whole being constructed as and for the purpose set forth.

29,742.—Charles Worden, of Ypsilanti, Mich., for an Improved Apparatus for Regulating the Flow of Water from Cisterns:

I claim the combination of the float, piston and box, with partitions, B and W, having openings, J G F, and pipes, A and K; the whole constructed, arranged and operated in the manner and for the purpose set forth.

29,743.—John Bird, of Birmingham, Pa., assignor to Bakewell, Pears & Co., of Pittsburgh, Pa., for an Improved Fastening for Metallic Covers to Glass Vessels:

I claim attaching the metallic hinged cover to lager bier glasses and other vessels made of glass or earthenware, by means of a lug or lugs pressed on the rim of a vessel, having a suitable cavity in it, if there be one lug only, or between them if there be two lugs, in combination with a hinged cover having a tenon or pin to fit into said cavity attached to the lower hinge piece; the whole being arranged and constructed and attached substantially as described.

29,744.—H. A. Chapin, of Springfield, Mass., assignor to Wm. L. Schoener & Co., of New York City, for an Improvement in Stop-cocks:

I claim, in combination with the valve, B, and its seat and opening in the shell, C, the valve, G, and its seat and opening, F, in the shell, A; the several parts being arranged to operate as set forth and described.

29,745.—Henry Demmick (assignor to himself and P. H. Jackson), of New York City, for an Improvement in Flasks for Casting Iron Columns:

I claim the flask for casting columns, composed of two cheek pieces, b b, hinged on to the knowl, a, and provided with the sand cleats, g', as and for the purposes specified.

I also claim the movable metallic sand flanges, h h, formed with dovetail bases entering between the ribs cast on the inside faces of the cheeks, b b, so as to be removable at pleasure, as set forth.

I claim the divided cheek pieces, b b, and clamps, f f, fitted in the manner specified, so that the flask can be enlarged by separating said cheek pieces and introducing a bar between said parts, as specified.

29,746.—Isaac Rogers, of North Haverstraw, N. Y., assignor to Samuel Daskam, of New York City, for an Improvement in De-oxydizing Ores:

I claim the revolving cylinder, e, fitted with the helical or screw-formed divisions, 16, to receive the metallic ore in a pulverized state, and to submit the same to heat and constant agitation by the revolution of the cylinder, while the ore is gradually passed from one end of the cylinder to the other by the division, 16, as specified; the metallic ore being supplied through the hollow journal, 11, or its equivalent.

I also claim the arrangement of the flues, 7 7, in the chamber, d, with the flues, 3 and 14, to heat the cylinder, e, when combined with the dampers, 4 and 15, or their equivalents, to regulate the direction of the draft and the consequent heat of the cylinder, e, as specified.

29,747.—E. F. Reynolds, of West Farms, N. Y., assignor to himself and G. E. Sherwood, of Morrisania, N. Y., for an Improved Telegraphic Instrument:

I claim, first, The employment of one and the same type wheel, B, when the same has a continuous rotary motion, as described, for the purpose of transmitting and receiving messages; but this I only claim when constructed, operated and operating as set forth.

Second, The arrangement of the series of cogs, g g*, on the underside of the type wheel, B, in combination with a corresponding series of movable pins, e, operated by keys, E, and with a stop, s, on the lever, I, which carries the armature, construnted and operating substantially as and for the purpose specified.

Third, Arranging a stationary ring, d, forming the guide for a series of pins, l, in combination with a hooked cog, g*, on the underside of the rotary type wheel, B, substantially as and for the purpose described.

Fourth, The arrangement of the vibrating lever, l, and flaring teeth, k, in combination with the wheel, 1, springs, n', and regulating screws, n'', constructed and operating substantially as and for the purpose set forth.

29,748.—John Kelly (assignor to himself and T. Coate), of West Milton, Ohio, for an Improvement in Machines for Picking Millstones:

I claim the combination of the right and left hand screw, E, with the reciprocating carriage, D, carrying the pick arms, G, bars, L, springs, K, and tappet cylinder, O, operating in the manner and for the purpose described.

[This invention relates to a machine for forming the small grooves between the large furrows of a millstone, an operation which is commonly termed "cracking," and which gives a "tooth" or grinding capacity to the stone. The object of the invention is to perform the above-mentioned work far more expeditiously than it can be done by hand, and in a more perfect manner.]

29,749.—J. H. Story (assignor to Cameron, Story & Malone), of Cincinnati, Ohio, for an Improved Machine for Dressing Joists:

I claim the combination of the saw, I, carriage, J, and pivoted swing frame, L, constructed, arranged and operating substantially as and for the purposes set forth.

29,750.—J. H. Swan, of New York City, assignor to A. G. Williams, of Brooklyn, N. Y., for an Improved Folding Chair:

I claim the combination of the legs, A A B B, jointed arms, G, and the back, F, attached by joints, a a, to the legs, A; all being arranged substantially as and for the purpose set forth.

RE-ISSUES.

Charles Wilhelm and Anna C. Wilhelm, of Philadelphia, Pa., for an Improvement in Lamp Shades. Patented May 3, 1859, re-issue dated August 14, 1860:

We claim, first, The combination of the metallic shade, A A' A'', with the paper pictures, C' D' E', between sheets of mica, as described.

Second, We also claim the combination of the metallic frame, A A' A'', and the pictures, C' D' E', upon paper or any other suitable substance, substantially as described.

Third, We also claim the combination of the metallic frame, A A' A'', and the pictures, C' D' E', upon paper or other suitable substance, and the mica lining; the whole being arranged substantially as set forth.

J. L. Lowry, of Pittsburgh, Pa., for an Improvement in Fire Plugs. Patented Feb., 22, 1859; re-issue dated August 14, 1860:

I claim, first, The construction of the chamber, J, so as to make it answer the double purpose of a through way for one or more branch pipes and a readily-accessible chamber for the reception of a valve or valves; thus making one pit and one cover common to two, three, four or more mains, instead of several, as now required; all substantially as set forth.

Second, Combining a fire plug with the chamber, J, and its branches, when the valve, V, is located as described, for the purpose

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of effecting a circulation of the water under the valve of the fire plug to prevent it freezing.

Third, The combination with the fire plug and chamber, J, and branch pipes of the detachable many-valved hose branch (Figs. 8 and 10), when the said parts are constructed as described and arranged so that the nozzles of the hose branch stand at a convenient hight above ground for attaching the hose, substantially as shown and described.

Fourth, The removable gasket, c, in the ends of the branches or bowls, y, so as to renew the seats for the valves, b, when necessary, without disturbing the main or stop-cock; access to these gaskets being through the common chamber, j, as herein stated.

P. N. Burke, of Buffalo, N. Y., for an Improvement in Stoves. Patented July 19, 1859:

I claim the employment of diffusing plates, constructed substantially as shown and described, to promote the uniform distribution of the hot air, as set forth.

I also claim the arrangement and combination of the perforated plates, N R, the partitional plate, B, the flue, H, the fire-guard, I, hot-air pipe, L, and chamber, K, substantially as and for the purpose shown and described.

[This invention consists in perforating the top and bottom plates of the oven in such a manner that the highly heated air will be more equitably diffused through the oven than with ordinary perforated plates, in a stove where the cooking is effected by infected heat.]

J. W. Wheeler, of Cleveland, Ohio, for an Improved Method of Drawing and Delivering Water from Wells. Patented Jan. 17, 1860:

I claim, first, Operating the valve in the bottom of the bucket by the rear end of the trough; the lever actuating the trough being moved by the bucket, and the trough having a more rapid advance than the bucket, as set forth.

Second, I also claim, in combination with the above, the employment of a grooved pulley and weight to operate the bucket, having a strip of India-rubber fastened in the groove of said pulley, in the manner and for the purpose set forth.

J. M. Cooper, of Pittsburgh, Pa., assignee of S. W. Marston, of New York City, for an Improvement in Trigger-operating Revolving Fire-arms. Patented Jan. 7, 1857; re-issued July 26, 1859:

I claim, first, So constructing the lock of revolving-breech fire-arms, which may be operated by trigger, as that the hammer, when raised to full cock, preparatory to firing, may be retained in that position of unstable equilibrium until the piece is fired on a further pressure on the trigger, by means of a vibrating tooth or fly-tumbler, independently of any dog, pawl, catch, or other mechanical device for that purpose.

Second, So constructing and arranging the lock of revolving-breech fire-arms, susceptible of operation by trigger, as that, when the hammer is raised to cock, preparatory to firing, the trigger shall be held back or retained in a drawn position by means of a vibrating tooth or fly-tumbler.

Third, The use, in revolving-breech fire-arms, of a revolving tooth or fly-tumbler interposed between the hammer and trigger, and operating substantially as described by an upward pressure on the hammer, so as gradually to increase the leverage, and, consequently, the power applied to raise the hammer, and thereby reduce the effective resistance of the main spring, for the purpose of securing steadiness of aim and greater ease in firing, and also to allow the recovery of the trigger after firing for repeated action.

A. B. Taylor (assignor through mense-assignment to H. A. Burr), of New York City, for an Improvement in Machinery for Making Hat-bodies. Patented March 18, 1856:

I claim the combination of a vibrating concave surface, substantially as described, with an exhausted pervious cone on which the bat of flocculent fibers is held by the pressure of the surrounding air, substantially as and for the purpose specified.

And I also claim facilitating the removal of the bat from the pervious cone on which it is formed, by means of a blast of air forced into the cone, substantially as specified.

NOTE.—This week, as on many previous occasions, we chronicle the fact (alike gratifying to our clients and ourselves) that a large proportion of the above list of patents—THIRTY-NINE cases—were solicited through the Scientific American Patent Agency.

Notes and Queries

CORRESPONDENTS sending communications for publication in our columns are requested to avoid writing on both sides of a sheet of paper. This fault, though common to persons unaccustomed to writing for the press, gives great trouble to the printer (especially in long articles), and, when combined with illegibility of handwriting, often causes interesting contributions to be regretfully consigned to our waste-paper basket.

A. J. S., of N. B.—Appleton's "Cyclopedia" says that a good blacking for shoes is made by mixing 3 ounces of ivory black, 2 of molasses, 1 table-spoonful of sweet oil, 1 ounce of sulphuric acid, 1 ounce of gum arabic dissolved in water, and 1 pint of vinegar.

J. C., of Ind.—A locomotive does *not* exert a greater pressure on the track when starting with a train than when standing still.

M. B., of N. Y.—Yours received; but the use of cut-offs is so plain, and so well-understood by engineers, that it seems to us hardly worth while to explain it anew.

M. B. R., of Texas.—We know of no antidote for cynauret potass. It is certainly very desirable that an antidote should be found for this poison if it is used extensively for killing ants, as children are liable to get hold of it.

M. T. D., of Ky.—Clay is the cheapest and best substance which you can lay on the bottom of a pond to prevent the water escaping through a porous soil. The only way known to us for storing up a small stream of water is by the erection of a dam, whereby you will thus secure a considerable body of water for exigencies. The patent fee is $30 for every invention, with the exception of designs; the fee of the latter is but $15. An inventor can sell his invention before it is patented; but, generally, there are few who risk the purchase of an invention until a patent is obtained.

A. R., of N. Y.—Smee's battery is good for electro-plating. You will find a very full description of the whole process in Smee's "Electro-metallurgy," published by J. Wiley, of No. 56 Walker-street, this city. It would occupy a whole column of the SCIENTIFIC AMERICAN to give you the information requested, or we should give it to you with pleasure.

W. H. E. M., of Mass.—We prefer a round to a square rod for conducting lightning, because it has no sharp edges. Be sure and have the same mass of metal in each, as the conducting power is in proportion to the mass of metal—not the form.

J. H. A., of Cal.—Almost every plan and improvement which has been brought forward for saving fuel in steam engines has been described in the various volumes of the SCIENTIFIC AMERICAN. You will find a series of illustrated articles on boilers, furnaces and smoke-consuming arrangements in Vol. VII. (old series).

T. L. S., of Iowa.—In order to condense all the exhaust steam of your engine, and use it over again as feed, allow it to exhaust and condense in a close cold-water tank; then conduct it into an open pond, from which it may be taken by the suction pipe of the feed-pump.

AN ENGINEER, of N. Y.—There is an association of engineers in this city. Thomas B. Stillman is the president, and J. C. Merriam, secretary. They meet on Wednesday evenings, at their room, No. 24 Cooper Union Buildings. We think Lardner's work on the steam engine as good as any, but it is getting old. There is no good American work on the subject. To find the horse-power of an engine, multiply the area of the piston (in inches) by the pressure of the steam (in pounds) per inch, and the product by the distance (in feet) traversed by the piston per minute; divide the product by 33,000.

J. M., of Pa.—We do not know in what sense you use the word "decomposition," as applied to the atmosphere; certainly, not in a chemical sense, as the two gases are not combined, but only mechanically mixed in the air. New air would not be produced by evaporation of water, except to the very small extent that the air which had been absorbed by the water would be liberated.

INDAGATOR, of Pa.—Mercury at 40°, converted to vapor, expands 1,576 fold. Its capacity for heat is 33 times less than that of water. Linseed oil has not, properly speaking, any boiling point; at a temperature between 500° and 600°, it is decomposed, the three elements of which it consists—carbon, hydrogen and oxygen—forming new compounds, principally carbonic acid and carbureted hydrogen. The specific heat of carbonic acid is 221°, and of heavy carbureted hydrogen, 426°; water being 1,000°.

R. B., of Ill.—The Novelty Iron-works are located in this city. This company does not make locomotive engines. The Rogers Locomotive Works, at Paterson, N. J., are probably the largest in the United States.

R. D. R., of Tenn.—It is well-known that cedar chests and closets are excellent to keep furs and woolen goods free from moths. Many families cannot procure such chests without much trouble and inconvenience.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, August 25, 1860:—

D. A. P., of Ind., $30; E. W. F., of La., $25; G. C. A., of Ky., $30; W. F. V., of Ohio, $25; W. W. J., of Va., $25; J. C. G., of Cal., $275; S. J. H., of N. Y., $55; C. D., of N. Y., $30; G. C. G., of N. Y., $30; D. L., of Pa., $25; J. H. K., of Mass., $30; G. D. W., of Mich., $20; A. R., of N. J., $25; J. H. H. B., of N. Y., $32; N. F. B., of Ill., $30; E. G. O., of N. Y., $35; A. B. P., of Texas, $25; E. E., of Mass., $25; N. J. H., of N. Y., $30; N. B. S., of Fla., $30; E. D. M., of N. J., $20; Z. McD., of Ky., $35; W. C., of Iowa, $35; M. W. W., of Mo., $30; I. P., Jr., of N. Y., $30; J. B. T., of Ill., $20; L. L. A., of Mo., $15; E. S., of N. Y.. $30; J. W. H., of N. Y., $30; M. K., of N. Y., $32; A. S., of Pa., $25; E. D., of Mass., $30; J. B., of N. Y., $25; F. Z. N., of Conn., $25; B. F. C., of Conn., $30; C. H. C., of N. Y., $55; F. W. R., of Ind., $10; A. A. H., of N. H., $40; E. P. T., of N. Y., $30; I. G., of Pa., $25; W. H. S., of N. Y., $30; M. & C., of Ill., $25; G. W. D., of Iowa, $25; E. B. C., of Fla., $30; T. C., of Conn., $500; W. F., of Mass., $55; A. J. P., of N. Y., $55; J. F., of Va., $25; J. G. C., of Miss., $12; G. P. F., of N. Y., $25; C. & B., of Va., $30; T. & R., of N. J., $250; S. & H., of Ill., $30.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, August 25, 1860:—

J. B. T., of Ill.; J. B. McE., of Pa.; J. F., of Va.; A. R., of N. J.; J. G. C., of Miss.; S. & H., of Ill.; H. O. A., of La.; A. S., of Pa.; G. B. F., of N. Y.; A. R. P., of Texas; E. E., of Mass.; L. W., of Mass.; G. H., of Conn.; G. W. D., of Iowa; H. L. McN., of Mass.; E. G. O., of N. Y. (two cases); C. A. R., of Ala.; Z. McD., of Ky.; L. W., of Mass.; A. C., of Mass.; W. F. V., of Ohio; W. B. H., of Ga.; D. L., of Pa.; J. R. H., of Maine; F. Z. N., of Conn.; I. G., of Pa.; J. A. C., of Conn.; W. W. J., of Va.; A. A. H., of N. H.; C. H. C., of N. Y.; L. L. A., of Mo.; J. B., of N. Y.

NEW BOOKS AND PERIODICALS RECEIVED.

NATURAL PHILOSOPHY (School Series); published by Barnes & Burr, John-street, New York.

A good elementary work on natural philosophy, suitable for schools, is certainly a desideratum; and here we have it, ably edited by Professor Peck, of Columbia College, from Ganot's "Popular Physics," a French production. We consider it the best and most beautiful work on the subject that has yet appeared; and it will, no doubt, soon reach a wide-spread and deserved circulation. The common books on natural philosophy, used in our schools, are full of inaccuracies.

THE WESTMINSTER REVIEW; re-published by Leonard Scott & Co., corner of Gold and Fulton-streets, New York.

The most valuable feature in the "Westminster" is its able summary of cotemporary literature.

THE MANUFACTURE OF VINEGAR—its Theory and Practice, with especial reference to the Quick Process; by Charles M. Wetherill, Ph.D., M. D., Member of the American Philosophical Society, Academy of Natural Sciences, Pha. Member of Indiana State Medical Society, &c. Published by Lindsay & Blakistone, Philadelphia, Pa.

This is a 12mo volume of 294 pages, founded on the German work of Otto, and seems to be an exhaustive treatise.

THE REASON WHY—Natural History; by the author of the "Biblical Reason Why," &c. Dick & Fitzgerald, publishers, New York.

IMPORTANT TO INVENTORS.

THE GREAT AMERICAN AND FOREIGN PATENT AGENCY.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, are happy to announce the engagement of HON. CHARLES MASON, formerly Commissioner of Patents, as associate counsel with them in the prosecution of their extensive patent business. This connection renders their facilities still more ample than they have ever previously been for procuring Letters Patent, and attending to the various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c., &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of fifteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices; at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

A pamphlet of information concerning the proper course to be pursued in obtaining patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. They also furnish a Circular of Information about Foreign Patents.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Messrs. MUNN & Co.:—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

Communications and remittances should be addressed to

MUNN & CO.,
Publishers, No. 37 Park-row, New York.

MONEY MADE.—A VALUABLE PATENT FOR sale. Granted July 31, 1860. A few State rights sold cheap for cash. Address A. C. LEWIS, Burlington, Calhoun county, Mich. 10 2*

BOLTING CLOTH.—NINETY YARDS, SECOND-hand, in good order and ready for the reel, for sale at one-third its value, as the advertiser has no use for it. Address G. J. G., Box 134 Syracuse Post-office. 1*

TO MAGIC LANTERN EXHIBITORS.—TRANSparent photographic portraits of Lincoln, Douglas, Bell and Breckinridge, beautifully colored, for exhibition in the magic lantern; price $2 for each portrait. Sent by express on receipt of money. McALLISTER & BROTHER, No. 728 Chesnut-street, Philadelphia. Our priced and descriptive catalogue of lantern and sliders furnished gratis, and mailed free of charge to all parts of the United States. 1*

5,000 AGENTS WANTED—TO SELL FIVE new inventions—one very recent, and of great value to families. All pay great profits to agents. Send four stamps and get 80 pages particulars. EPHRAIM BROWN, Lowell, Mass. 10 4*

CHARLES A. SEELY, CHEMIST, NO. 424 Broadway, New York.—Analyses of ores, minerals, articles of commerce, &c. Advice and instruction in chemical processes generally; advice on chemical patents. 1*

WROUGHT IRON PIPE FROM ONE-EIGHTH of an inch to eight inches bore, with every variety of fittings and fixtures, for gas, steam or water. Sold at the lowest market prices by JAMES O. MORSE & CO., No. 76 John-street, New York.

GALVANIZED IRON PIPE—CHEAPER AND better than lead for water. Is used in the cities of Brooklyn and Hartford for water pipes in dwelling houses. Sold at wholesale by JAMES O. MORSE & CO., No. 76 John-street, New York.

CLARKE'S IMPROVEMENT IN ARCHITECture.—Hollow concrete walls.—United States Patents issued April 3 and 24, 1860. A new system in architecture is developed by these inventions, which is destined to speedily and mainly supplant wood and brick as a superior and cheaper substitute. Descriptive illustrated circulars furnished on application, when specimens of this superior mode of building may be examined in its various stages of progress. Competent and responsible men to introduce these improvements to the public, and to dispose of town and city rights, will be employed. Address or apply to the patentee, ELIZUR E. CLARKE, New Haven, Conn. 1*

SUPERHEATED STEAM KILN, DRIES LUMBER in 30 hours; meal for two cents per barrel; and warms buildings by furnaces and stoves cheaply and healthfully. Circulars free. Rights low. [10 2*] H. G. BULKLEY, Kalamazoo, Mich.

SECOND-HAND MACHINERY FOR SALE.—ONE iron planer—length of ways, 20 feet; crosshead, 2½ feet wide, 3½ feet high. One 15-feet lathe, double-geared, 28-inch swing, with scroll chuck. One 9-feet lathe, with screw cutter, 18-inch swing. One 9-feet lathe, back gears, 18-inch swing. One 8½-feet lathe, with back gears and screw cutter, 16-inch swing. One 8-feet lathe, with back gears and screw cutter, 16-inch swing. One trip-hammer, 6½-feet bed. One 21-feet Daniels' planer. The above machinery is all in good working order, and will be sold cheap. Apply to the Buffalo Agricultural Machine Works, Buffalo, N. Y. 10 2*

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THE THIRTEENTH ANNUAL EXHIBITION OF the works of American Industry, by the Maryland Institute, will be opened in the city of Baltimore on Tuesday evening, October 9, 1860. Manufacturers, Mechanics, Artists, Inventors and others are most cordially invited to contribute to this exhibition. The utmost care will be exercised by the managers to make this exhibition both pleasant and profitable to the exhibitors, and especial attention will be given to the selection of judges, so as to insure complete justice in the distribution of awards and premiums, which will consist of Gold and Silver Medals, Silverware, Jewelry, &c., &c. Freights on machinery, by steamboat, from New York, Boston or Philadelphia will be free, or settled by the Institute; and if the owner is not present, by forwarding the bills of lading to the Chairman of the Committee, the goods will receive his personal attention in fitting-up and arranging the same for exhibition. From the success of our former exhibitions, the facilities and convenience offered at this exhibition, together with the central location of our city between North and South, gives us reason to believe that we shall be able to offer greater inducements to manufacturers, mechanics, artists, inventors and others to exhibit at this Fair than has ever been offered at any similar exhibition in this country. Circulars, containing regulations and arrangements, will be promptly furnished, on application to the Committee or JOHN S. SELBY, Actuary of the Institute. E. WHITMAN,
8 4* Chairman of Committee on Exhibition.

PATEE & RYAN'S SOLDERING-IRON—PATented July 3, 1860. State and county rights for sale. Apply to LESTER PATEE, Peoria, Ill., or to A. H. RYAN, No. 1,024 Broadway, New York. 8 3*

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MUNN & CO., Scientific American Office, No. 37 Park-row, New York.

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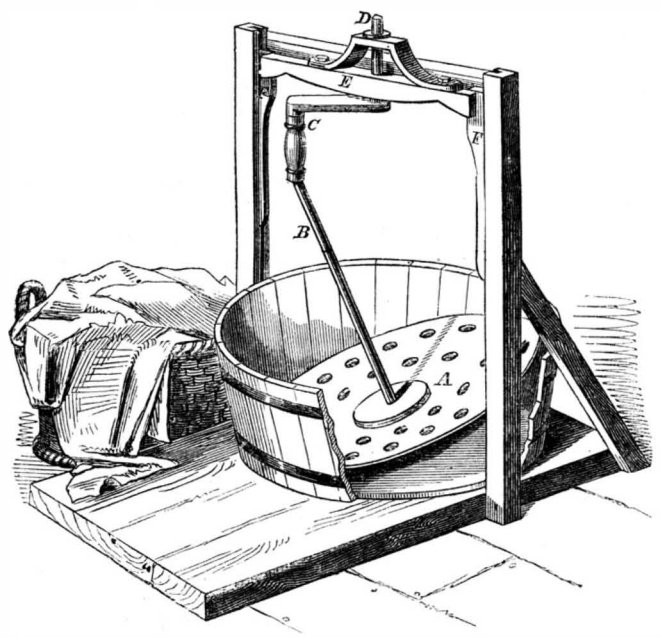
IMPROVED CLOTHES-WASHING MACHINE.

Perhaps some of our readers may have supposed, twenty years ago, that all possible improvements in washing machines had been made, and we ourselves are very apt to feel as if each one that we described must finally be the last of the series. But "the end is not yet," and the amount of labor expended weekly in washing clothes is so enormous that a great deal of thought is devoted in the effort to economize it, and we doubt if even the machine which is here illustrated will be the very last washing machine ever invented in the United States. We think that our inventors are now on the right track, and that this machine, like the last one which was illustrated in our columns—the great Shaker steam machine, which has been so extensively introduced and works so well—operates on the correct principle for effectual washing.

The circular perforated plate, A, is fastened to a shaft B, which is hung in ball-and-socket joints at both ends, the lower end in the center of the bottom of the tub and the upper end in the handle of the crank, C. The shaft of this crank has its bearings in a cross-bar, E, which is secured to the slides, F F, so that the crank may rise and fall vertically. The clothes are placed in the tub under the plate, A, when, by revolving the crank, C, they are alternately subjected to pressure and released from it, thus being repeatedly saturated with water and having the water pressed out of them without rubbing; this is the mode which we have long regarded as the true one for washing clothes.



PATTERSON & RAMSEY'S CLOTHES-WASHER.

A patent for this invention was issued, through the Scientific American Patent Agency, on August 21, 1860, and further information in relation to it may be obtained by addressing the inventors, N. A. Patterson and W. L. Ramsey, at Kingston, Tenn.

NEW PROCESS OF REFINING SUGAR.

We translate the following article from *Le Génie Industriel:*—

Messrs. Périer and Possoz—in view of the fact that the brown sugars of commerce generally contain calcium combinations, and always coloring matters, which lime methodically employed renders precipitable by carbonic acid—have been led by a series of experiment, to the following manipulation, which gives excellent results, and for which they have secured a patent in Belgium.

They commence by dissolving the sugar in a quantity of water, variable according to the quantity of sugar to be refined and the mode of filtration adopted. A quantity of slacked and diluted lime is added to this brown sirup, the proportion varying with the impurity of the sugar, from 5 to 10 lbs. of quick lime to 100 lbs. of sugar. This mixture is then carbonized either cold or warm; though the inventors prefer that it should have a temperature of from 100 to 140 degrees. The carbonization is continued until the calcareous precipitate separates from the liquid in the form of clots. At this phase of the operation, litmus paper strongly reddened is restored to the blue color by the lime in solution in the sirup; and at this moment the mixture is filtered or separated from the calcareous deposit by any known means.

The sirup, deprived of this calcareous deposit is already well purified, and this treatment may be finished either by pushing the carbonization further, or by carbonizing completely the sirup deprived of its first colored deposit. But as, ordinarily, at this first carbonization, the sirup is not sufficiently deprived of its soluble matters, there is added to it another dose of lime, feebler than the first, in the proportion of two or three per cent of lime to the sugar. This second addition of lime is carbonized completely, that is to say, until some filtered drops of this sirup form no precipitate with oxalic acid, or even until limped lime water is rendered turbid by some drops of this filtered sirup, which denotes an excess of carbonic acid in the sirup, and consequently the saturation of all the lime which it contains. In this latter case it is necessary to subject the sirup to ebulition before filtering it, in order to precipitate the carbonate of lime held in solution by the excess of carbonic acid.

The carbonic acid which Messrs. Périer and Possoz prefer to employ for this refining operation is taken from the furnaces of the sugar-house or other furnaces; it being one of the principal products of combustion. Before passing this gas into the sirup, it is partly cooled by washing it with care so that it will not soil the sugar in the least degree. This gas is easily obtained by drawing out the products of combusion at their entrance into the chimney, with a pump, at the same time using their caloric to heat either air or water; so that the carbonic acid not only costs nothing, but there is obtained from it an enormous quantity of heat which is ordinarly lost.

The second calcareous deposit is separated from the sirup by repose, filtration, centrifugal force or any other known means, and the sirup is concentrated to the ordinary point. The less dense the sirup when first made, the more easily will the deposit be separated.

IMPROVED LAMP.

From the beginning of creation, *light* has been deemed of primary importance by the sentient beings of the universe The study of its complex character has engaged the attention of the very greatest intellects that the world has ever known; to obtain the material for its artificial production, men have explored all seas and braved the rigors of every climate; and the perfect consumption of this material seems to be an inexhaustable field for experiment and contrivance by the highest class of intellect among inventors.

Fig. 1

Fig. 2

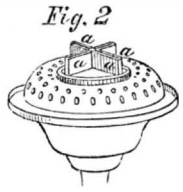
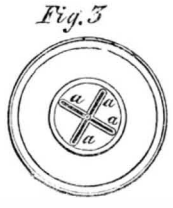


Fig. 3



In the lamp which we here illustrate the flame is made in the form of a cross, in order to expose a large surface to the air and thus insure a perfect combustion of the oil. The wick is made of stout cotton flannel in four strips, each about three-quarters of an inch in width, and the wick tubes, *a a a a*, are made of proper dimensions to receive the wicks, and of the cross-shaped form shown in Fig. 2. No chimney is required, and the lamp burns perfectly in a still room without any globe. Cotton seed, lard, coal, and other heavy oils are used, and the lamp is adapted to them. One great advantage of this lamp is its perfectly simplicity; there are no screws, loose tubes or other complicated parts, requiring the care of a skillful mechanic to keep it in order, but the stupidest negro in the country can take care of it.

The patent for this invention was granted Feb. 14, 1860, and further information in relation to it may be obtained by addressing the inventor, Sheldon Guthrie, at New Orleans, La.

THE CAUSE OF THE FAILURE OF THE ATLANTIC TELEGRAPH.

The insulating of submarine telegraph cables with india-rubber instead of gutta-percha is attracting a great deal of attention in England. Several papers on the subject have been read before the British Association for the Advancement of Science, by some of the ablest and most experienced electricians in the kingdom, and it seems to be the general opinion that gutta-percha is absolutely worthless for this purpose, while india-rubber, from experiments extending over 20 years, promises to answer every requirement. India-rubber, besides its manifest superiority in other respects, is a far better insulator than gutta-percha; though the opposite opinion has been widely disseminated. The Atlantic cable, besides the use of gutta-percha as an insulating agent, had also another fatal defect, the spiral form of the external wires. This form permitted the external coating to stretch under a strain, and this almost completely destroyed its value for the purpose for which it was intended. The great blunder in the conduct of the Atlantic telegraph enterprise was the childish haste with which it was hurried through; not permitting a proper test of the various new plans required in the novel scheme. This blunder will now be avoided, and it is probable that the next effort will be successful.

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